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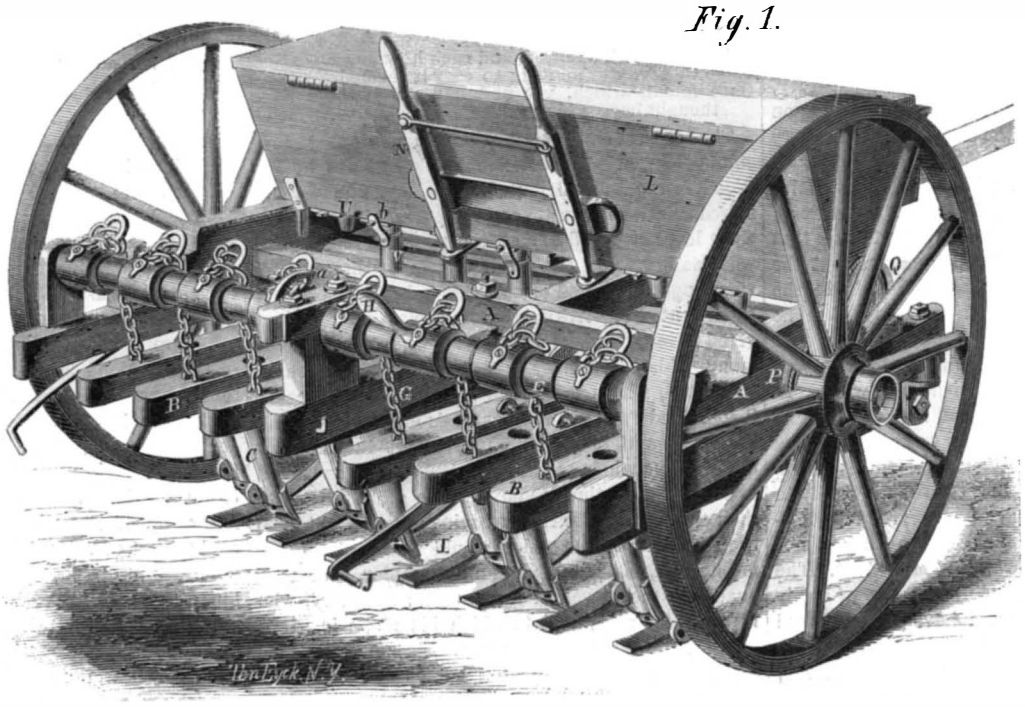
Improved Seed Planter.

The associations which are naturally connected with the business of farming seem in a fair way to be broken up, and seed time and harvest become so many opportunities for the inventor to display his skill and cunning. Already the fatiguing labor in a hay field has succumbed to the mowing machine, and long before the high hot noon arrives it has laid the grass in long, even windrows, ready for the patent spreader, raker or loading machines. So it is with the process of planting. Not long ago we read in an old work some instructions upon the art of planting beans. Now beans are good things in their places, but by the way in which the book in question said they were to be planted, mankind would get very few of them. The plan was to take a sharp stick, go over the field, make holes as you went, and put some beans in; and thereafter the harvest would spring up strong and flourishing. This may have been satisfactory enough to our grandfathers, but in these better days we work more wonders in an hour than with their patience and perseverance they were able to accomplish in a week, and at the present demand for the esculent our respectable progenitors would be very far behind the age.

Fig. 1.

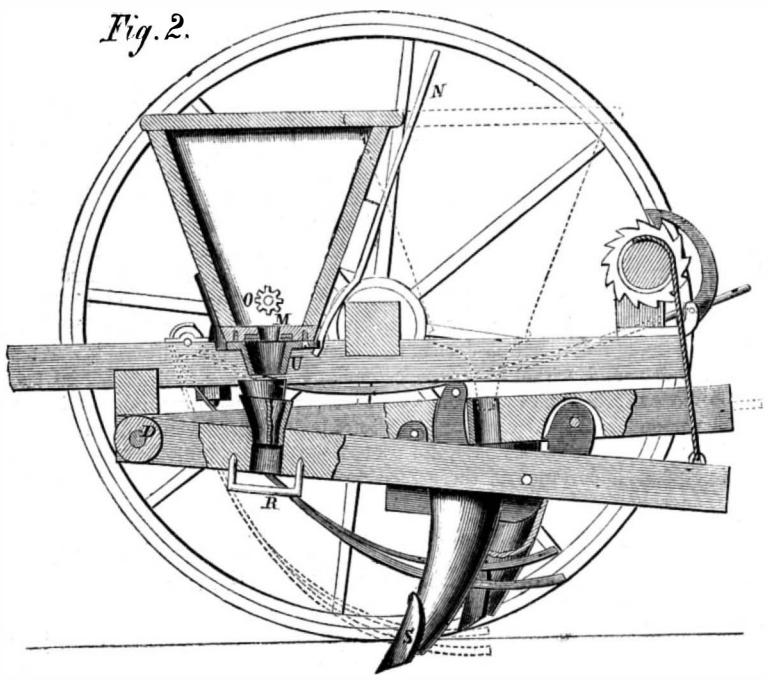


RICH'S SEED-PLANTER.

The machine illustrated herewith is intended for planting seed, either in drills or broadcast, and the change from one method to the other is effected in the most simple way, by merely changing the seed box from one end of the machine to the other.

In the annexed engravings both the external and internal plans are shown, and they are so simple that the reader can derive a clear idea from them without the aid of a description. The frame, A, is furnished with a series of strong bars, B, which have the grain spouts and drills, C, firmly attached to them. The bars are all jointed to a shaft, D (see Fig. 2), at the front end of the machine, and in the rear there is another shaft, E, which works in bearings on the main frame, A; it also has a bearing on the central timber, F, which is merely a prolongation of the draft pole. The shaft, E, and the bars, B, are connected by chains, G, which are for the obvious purpose of raising the bars and drills from the ground; when the handles, H, on the shaft, E, are forced down, the ratchet wheel and pawl, *a*, hold them at any point. Between the bars there are a series of metallic weed-clearers or drag-bars, I, which are intended to free the drills from rubbish or pass them over obstructions that may get clogged about them in going over manured land; these clearers are attached to an independent shaft, and are worked up and down by the handle, J, as occasion requires; when not in use they may drag on the ground or they can be lifted up clear of it and kept suspended by the catch, K, on the main frame. The seed box, L, sets forward of the axle for broadcast sowing, and it has a series of apertures, M, at the bottom (see Fig. 2) which are covered by a slide when not in use. These slides, for they are divided in their lengths, are worked by the levers, N, and either or both may be used at once; the hook which unites them being thrown off when one only is to be employed. There is a small funnel, U, attached to the under side of the seed-box bottom which receives the end of the flexible chute, V, or elastic tube of guttapercha leading to the drills where they are used, or to the holes in the bars, B, underneath, when sowing broadcast. These tubes have small flaps, *b*, which button over lugs on the seed box so that they can be quickly secured in their places. There are also a set of small-toothed wheels inside the seed box, which are revolved by the belt, P, running from the main axle to the pulley, Q, on the shaft the wheels are keyed to. These wheels are stirrers, and keep the grain agitated so that it falls easily into the chutes. Immediately below the bottom of the bar, B, there is a scattering rod, R (Fig. 2), on which the grain falls, as it descends, and is evenly distributed over the ground. The tubes the drills are fastened to are peculiarly shaped. The upper opening being much longer fore-and-aft than it is wide.—From this plan the tubes (which are "staggered" or placed irregularly with reference to each other) never become clogged, as the seed has a free opening to fall into, which would not be the case if the chutes were bent or the drill tubes perfectly round and of the same diameter. The drills, S, are fastened on to the pipes with bolts, and have a series of holes in them so that they can be lowered as they wear from grinding and use. In Fig. 2 one form of the weed-clearer used by the inventor is shown at T, it embraces the tubes, and the action is similar to the one before described, the positions it assumes being indicated by dotted lines. By these several details and their relation one to another, a simple and most efficient machine is produced which will do its work well and require little attention either for repair or oversight when at work. The change from broadcast to drill sowing can be made in a few minutes, and with the use of a wrench only. The drill tubes will not clog, and persons of ordinary intelligence can easily run the machine. In these days, when help is so very scarce and farmers are obliged to rely upon newly imported laborers, who have but imperfect ideas concerning labor-saving machinery, this feature will be found a valuable one.

Fig. 2.



This invention was patented on the 1st of December, 1863, by Martin Rich, of Candor, Tioga county, N. Y.; for further information address him at that place.

COFFEE in roasting loses about 16 per cent. in weight.

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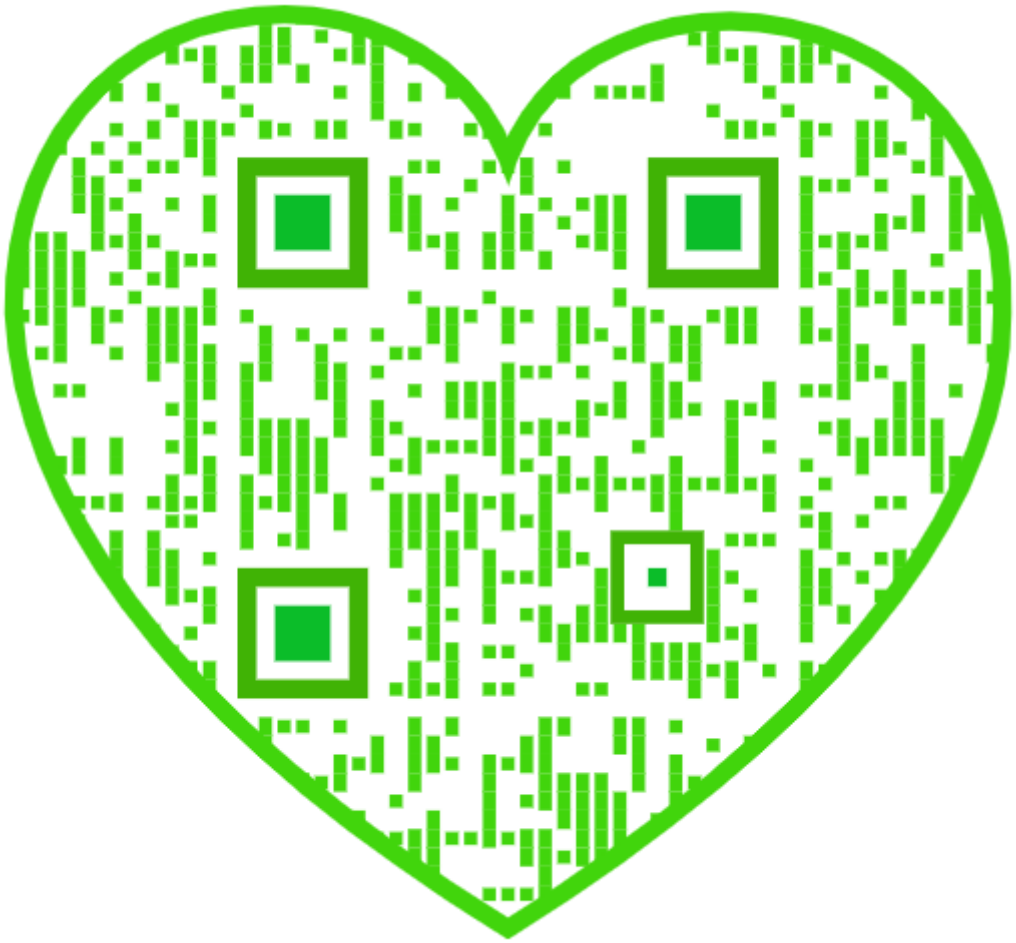

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS.

I now recur to the first and most important question, whether the patent policy has actually increased the industrial resources of nations.

It is grateful to refer to the testimony upon this point, given before the committee before referred to, by intelligent practical men, thoroughly familiar with the operation of the patent laws and the condition of the arts in Great Britain. Mr. Carpmael, a patent agent of great experience, in reply to the question, "Are you of opinion that the present patent law might be safely repealed altogether, and inventions deprived of all privileges of protection?" replies, "I can only say that I can see no inducement to an inventor to come forward to benefit the manufactures of the country, unless you give him some reward. Looking through the history of the whole of the manufactures of this country, you will find that all the steps have been founded upon patents, from the earliest date up to the present time. Take any branch, whether it be the cotton manufacture, the steam engine, the manufacture of flax or wool—in the case of every one, if we trace the history of it through, which I should be happy to do if it were necessary, it will be seen that the whole system is based upon patents. Paper-making is the same, and so in every branch that I remember."

Being asked, "Can you, without difficulty, point out a certain number of very important inventions, which were preceded by such costly experiments that they could not have been carried out without the patent law?" Mr. Carpmael says:—"Watt, in the case of the steam engine, was seven years before he got the first engine to work efficiently. In the case of Arkwright's machine for spinning cotton, he was several years before he got efficiently to work. In the case of Crompton, the same; in the case of Hargraves, the same. Then, in regard to combing wool by machinery, and the first power-loom by Cartwright, he did not succeed in getting practically to work for many years, and he was rewarded by Parliament for what he had done, because he had not been remunerated in the working of his patent. The paper machine was worked out by a series of costly experiments, which never would have been entered upon but for the patent laws of the country. In this manner might I go through all our manufactures; indeed, in no instance has any manufacture grown into importance in this country except by a series of costly experiments and costly machinery, carried on for many years, in the hope of deriving benefit through grant of letters patent."

Mr. Webster, the well-known writer on patent laws, stated before the committee:—"I am quite sure of this, that if any person who may be disposed to think that patents should be done away with, comes to examine the way in which particular manufactures have been built up by reason of the large amount of capital which has been thrown into them, in reliance upon the action to be obtained by means of the protection given for a short time, he will be very much surprised. In some of the most successful inventions of the present time, it will be found that the first patent effected little; but, in attempting to work this out, further improvements were made, and fresh patents obtained, so that by the protection which has been given to different stages of the invention, and the quantity of capital which has been laid out upon it, the invention has been perfected and introduced, and made useful to the public in a time within which it never could have been done but for the money which has been employed upon it, in reliance upon the protection of the patent. The whole of our experience of cases before the privy council is proof of that, and leads to the conclusion that many inventions would never have been introduced at all without such protection; and no man, so far as my knowledge of manufactures goes, would have ventured upon those experiments had it not been from some such inducement as the reward offered by the patent law."

Mr. Bennett Woodcroft, the accomplished Superintendent of the Great Seal Patent Office in England, under the Commissioners of Patents, to whom more than any other person is due the publication of the specifications and drawings illustrative of all the patents granted in England since 1617—a work which may be justly regarded as one of the proudest monuments of British genius—has added to the many obligations conferred upon this office by presenting to it, within the last year, a series of engravings executed in the highest style of art. Their subjects can be best described in his own words:—"Actuated by a sincere respect for mechanical genius, and a warm admiration of its productions, I have collected all the known portraits, eight in number, of the *ten mechanicians* whose inventions laid the foundation, raised the superstructure, and now secure the continuance of the cotton manufacture, the most marvellous for its extent and effects that ever employed the ingenuity of man."

Mr. Woodcroft, in a memoir which he has published containing brief biographies of inventors of machines for the manufacture of textile fabrics, observes that in looking at the progress and magnitude of the cotton manufacture, surprise is excited at the simple construction of the few machines which have produced such wonderful results, "at the lateness of their revelation and their tardy adoption." And he appositely applies to those works the words of Milton:—

Th' invention all admired, and each how he
To be th' inventor missed; so easy it seemed,
Once found, which, yet unfound, most would have
thought impossible.

The ten mechanicians to whose inventions the results produced in the cotton manufacture are by Mr. Woodcroft mainly attributed, are—Kay, who was inspired to run the shuttle on pulleys, and impel it by a short lever attached to a string, by which one weaver was enabled to do the work of two or three; Paul, who taught a method of spinning a hundred or more threads at once; Arkwright, who reinvented and revived roller spinning; Hargraves, who invented the jenny, which drew sixty or seventy threads at once; Crompton, who invented the *mule* (so called because it combined Paul's and Hargraves's inventions); Radcliffe, the author of the improvement in sizing or dressing the whole of the warp before it was wound upon the beam, thus removing the grand difficulty then existing in the art of weaving; Cartwright, who brought forth a loom which would weave cloth by a mechanical, instead of a manual, motor, and thus quadruple the power of the weaver; Jacquard, who invented the apparatus to which his name is given for selecting the warp threads, which superseded the service of the draw-boy at the loom; Roberts, who made the mule of Crompton automatic, or self-acting; and Heilmann, who, from observing his daughters comb their hair, conceived the machine for combing cotton and wool, ever since in universal adoption.

Mr. Woodcroft thus states the result in Great Britain alone, produced mainly, as he considers, by these ten inventions. In 1760, at the accession of George III., the entire value of cotton goods manufactured in England was about £200,000 a-year. In 1772 British calicoes were made to the number of 50,000 pieces. In 1816 upwards of 1,000,000 pieces were manufactured. In 1750 the population engaged in the cotton manufacture was about 20,000. In 1801 the persons engaged were about 80,000. In 1823 there were 10,000 steam-looms in Great Britain. In 1862 their number was 399,992, driven with a power of 294,000 horses, and employing 451,000 work-people in 2,887 factories, containing 30,387,457 spindles. Every one of the ten inventions which have produced these marvellous results was protected by patents; each inventor was stimulated by the reward which this protection opened to his hope, if not his fruition, and, without the prospect of appropriating to himself wealth and honor, would have shrunk from the labors of creating and introducing his invention. Granting, as is quite probable, that the individual importance of these men, in relation to the cotton manufacture, is somewhat exaggerated, and that the credit given to them should be shared with the eight hundred men who have taken out patents for improvements in this manufacture, it is no less true that the whole system of the manufacture of cotton in Great Britain is founded upon patents.

Illustrations, less striking, it may be, but not less convincing, of the beneficial influences of the protection afforded by patents, can be found in the history of the industrial arts in this country. I will point to a totally different branch of manufacture which had its undoubted origin, and has attained its perfection, in the United States—the manufacture of india-rubber goods. The facts are obtained from records in this office and reports of committees in Congress. India-rubber was introduced into France in 1776. Dr. Priestley says that, in 1791, he saw a specimen of the gum at a stationer's, where it was used to erase pencil-marks—hence its name. In 1823 five hundred pairs of shoes, made by the natives in South America directly from the exudations of the gum-bearing tree, were imported into this country, and sold at Boston. In the years 1832, 1833, 1835, and 1836, several manufactories were established in New England for making india-rubber goods.

Upon their introduction into market it was found that the goods became clammy and sticky when exposed to heat, and were stiffened by the cold. They were therefore useless. In consequence of these defects, in 1839 all the companies and individuals engaged in the manufacture were ruined The manufacture was utterly prostrated. At this time a simple workman in Connecticut, named Hayward, who had undertaken to carry on this manufacture by himself, who, to use his own words, hired the shop he worked in, and whose only income from the uncertain profits of his business was about five hundred dollars a-year, sought day and night to discover some substance which might be combined with the india-rubber and cure its defects. Absorbed in the search of what to him was the philosopher's stone, "he dreamed at night," as he asserts, that the desired solvent was sulphur. He combined the rubber with sulphur, and, to his delight, discovered that the defects in the goods were almost wholly overcome. He had miraculously, as it were, discovered a substance which combined chemically with the rubber, making, in fact, a sulphuret of rubber—indeed, a new substance, whose structure is fibrous like horn, whereas the structure of rubber alone is granular, or molecular. He obtained a patent for his discovery; but being heavily in debt, and perhaps unable to conceive of the vast consequences which would result from his invention, he sold the right to his invention for a mere pittance to Mr. Goodyear. The latter experimented upon the new compound discovered by Hayward, and discovered the art of vulcanizing it. This invention is thus described by Mr. Webster, in his great speech at Trenton:—"The great peculiarity of this vulcanizing process is this: If you take a compound of sulphur and rubber in a dry state and grind and mix them together, and apply heat, the consequence is, that the substance softens and softens as the degree of heat increases, until it reaches a certain hight in the thermometer, say 212° Farenheit and along there, a little more or less. Well, anybody," says Mr. Webster, "who ever tried the effect, to see what would be the operation upon this compound, and finding that it ran up to a great degree of heat, softening and rendering it more and more plastic as the degree of heat was augmented, would naturally be of the opinion that if the heat was carried still higher the whole substance would melt. But Mr. Goodyear, as the result of untiring experiment, found out that, although the application of heat produced a melting effect upon this compound, rendering it more and more plastic and soft as the degree of heat augmented, yet when the heat, going on, had got up to a certain much higher degree, its effect was the reverse of what it had been, and then the rubber composition commenced to vulcanize and harden, and in fact to make metallic the vegetable substance." The result of the two inventions is thus stated by Mr. Webster:—"It introduces quite a new material into the manufacture of the arts, that material being nothing less than elastic metal. It is hard like metal, and elastic as pure original gum-elastic. Why, this is as great and momentous a phenomenon occurring to men in the progress of their knowledge, as it would be for a man to show that iron and gold could remain iron and gold, and yet become elastic like india-rubber." Mr. Goodyear obtained a patent for his discovery, and granted licenses to manufacture under his and Hayward's patents. The manufacture at once revived. Twenty years afterwards the yearly sale of goods created by these inventions in the city of Boston alone was set down at $2,500,000. Thousands of operatives are employed in their manufacture. The uses to which the vulcanized rubber is applied are innumerable, and new uses are discovered every day. Water-proof shoes, clothing, tents, pontoons, blankets for soldiers—invaluable as they have been proved in our

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service, preventing the loss of thousands of lives, and promoting the health and comfort of the soldier to a degree beyond estimation—buckets, life-preservers, mail bags, car springs, suspenders, pencil cases, combs, boxes, are only a few of the countless articles made, specimens of which may be seen in the beautiful collection deposited by Mr. Goodyear in the saloons of this office. There is probably not a family in the country that does not use these goods, and there is hardly an instance on record in which inventions have within so short a period become so essential to general comfort and convenience.

It is unnecessary to say that this great manufacture was founded upon the stimulus which the patent privilege gave to the inventors, and the protection which the patents have given to the manufacturers.

I have spoken of the great spinners and weavers who have carried the cotton manufacture to its great perfection in Great Britain. An invention in the class of textile manufactures has been made by an American, which equals in ingenuity anything which has been accomplished in Great Britain or France. The history of the invention proves that it would not have been introduced without the protection which the patent afforded, and there is precise evidence on record of the saving in money which it has effected for the consumers of the country. Previous to 1842 all three-ply and ingrain carpets were woven in hand looms, the motive power being furnished by the weaver. Numerous and costly experiments to weave ingrain carpets by power-looms had been made in England, but had proved unsuccessful. Mr. Erastus P. Bigelow, of Massachusetts, in 1842, conceived of a series of devices for making the carpet loom automatic, so that the costly labor of men might be dispensed with, and the whole process of weaving might be conducted by girls and boys. After laying his plans before many manufacturers, without obtaining their approval, he succeeded in engaging the attention of the treasurer of a manufacturing company in Lowell, who had the intelligence to see the importance of the undertaking, and to understand the grounds of its probable success. Through him he made an engagement with "the Lowell Company," which, in consideration of the exclusive right to use all his inventions then or afterwards made, so far as they could be applied to the weaving of ingrain carpets, agreed to pay the expenses of putting a trial loom in operation, and if that proved successful, to build a power-loom mill, and to pay Mr. Bigelow a certain patent rent per yard upon all carpeting woven during the existence of the patents which Mr. Bigelow was to take out for his inventions. The trial loom proved successful, and the company proceeded to erect mills to manufacture carpeting under Mr. Bigelow's patents. The cost of these works was many hundred thousand dollars, the fixed capital of the company in their carpet works being $978,956. This vast outlay was made, and in fact the whole improvement was based, upon the protection given by the exclusive right under the patents. The invention was of such a character that it could be developed, tested, perfected, and made practically useful only by the expenditure of a vast capital The only security for this outlay, which no individual could have made, was the protection of the patent. The company were careful to secure the right to all future improvements which the inventor might make. Encouraged by the certain though moderate reward offered by his arrangement with the company, the inventor continued for four years after the first loom was devised, to add new improvements, which were protected by five more patents; and it now presents a machine which is admitted to be unsurpassed by anything which the mechanical genius of man has ever devised. The benefits which this invention has conferred upon the manufacturing company, the inventor, and the public, are precisely shown by records in this office. The "Lowell Company" granted to the "Hartford Carpet Company" a license to use these inventions, the use being confined to these two companies. The profit in the carpet department, in the Lowell Manufacturing Company, from Oct. 31, 1859, to April 30, 1863, was $687,801 41. The total dividends of the Hartford Carpet Company from January, 1855, to July, 1863, were $1,009,649 50. The par value of the stock, $100 per share. The market value, $155 to $160 per share.

The total receipts of the inventor from his royalty have been $50,432 12. The benefit to the public by this invention is, first, the production of superior goods, the texture of the power-loom carpeting being more uniform, the selvage more even, and the matching of the figures more perfect. The actual saving to consumers is thus calculated: Prior to the introduction of the power-loom, the Lowell Manufacturing Company paid, as wages for weaving by the hand-loom the description of carpeting known as two-ply, $11\frac{3}{4}$ cents per yard, and for three-ply 25 cents per yard; whereas, with Bigelow's power-loom, they only pay for weaving the former article $2\frac{57}{100}$ cents per yard, and for the latter $2\frac{83\frac{3}{4}}{100}$ cents per yard; thus showing a saving by the power-loom in wages paid for weaving of $9\frac{18}{100}$ cents per yard for two-ply, and $22\frac{17}{100}$ cents per yard for three-ply, being an average of $15\frac{67}{100}$ cents per yard. But the saving in wages is partly neutralized by the more costly repairs of the power-loom machinery, and interest on the larger investment of capital required therefor, so that the average net saving by the power-loom is estimated at ten cents per yard. Accurate returns from the mills of the Lowell and Hartford companies up to April, 1863, show that the number of yards of carpeting woven upon looms was 25,964,185 yards; thus the saving to the people by this invention has been two million five hundred thousand dollars. That the saving in the price of manufacture of carpets has accrued to the consumers is evident from the fact that at the time Mr. Bigelow's invention was introduced the wholesale price of the best quality of two-ply carpeting was from eighty-five to ninety cents per yard, and of three-ply from one dollar and thirty to one dollar and thirty-three cents per yard; whereas, in 1860, the former description of goods, power-loom wrought, of a better quality than the hand-loom wrought, sold for from seventy to seventy-two and a half cents per yard, and the latter from ninety-five to ninety-seven and a half cents per yard, making an average reduction of over twenty per cent. It is worthy of observation that the ingrain carpets are used not so much by the wealthy as the middle classes. They give comfort and attractiveness to the homes of the people, and thus this invention, originated and introduced by the patent policy, has had a sensible effect in ameliorating and refining society.

The "Great Eastern" Steamer and the Atlantic Telegraph.

The *Great Eastern*, it is reported, is likely to leave this country for a French port. It is said, also, that she is under charter, subject to sale, to lay down the Atlantic Telegraph Cable in 1865. For this service the owners are to receive £60 000 in "greenbacks," the name now given to the share certificates of the Telegraph Company. It was calculated that the cable to connect Ireland with Newfoundland would not cost more than £600,000 but the company are endeavoring to raise another £150,000 to pay for the increased cost caused by the enlarged size and weight of the insulated wire and covering. If, however, the French Government determine upon purchasing the *Great Eastern*, she will not be available for carrying out the contract, in which case a lighter cable will have to be substituted. No progress has been made in the manufacture, nor is it necessary to commence operations for some months yet, as the storing of such a bulk would lead to sweating, and perhaps damage, before shipment. Messrs. Glass and Elliott's contracts with the gutta-percha works have been transferred to a limited liability company. The company are to receive half cash and half shares for the making and submerging the transatlantic cable, and, as the actual cost does not exceed £350,000, it is calculated that the company will be fully reimbursed for their outlay, whether the cable ultimately succeeds or fails. Should the *Great Eastern* be sold, and a smaller cable be decided on, in consequence of the difficulty of finding a ship large enough to convey 4,122 tuns of this dead weight, allowing also for space to wind round drums, it is thought that a reduction will be made in the price, and the old capital of £600,000 adhered to. This connecting Europe and America by submarine telegraphy appears to be beset not only with electrical but with nautical and pecuniary difficulties. At the meeting of the shareholders of the Atlantic Telegraph Company, recently, the chairman stated that the paid-up capital of the company represented only £316,000. If, then, the heavy cable cannot be laid, it is useless resorting to the small one, and the impression gains ground that we are once more to have a failure.—*Mitchell's* (*London*) *Steamship Journal.*

Discovery in Photometry.

It is the established practice in measuring the light of illuminating gas to compare the light of a five feet Argand burner with that of a spermaceti candle burning 120 grains an hour; and when the candle used burns less or more than the 120 grains it has been regarded as a matter of course that the light would vary in the same proportion. But the scientific evidence given before the committee of the House of Lords, in England, on the bill of the Birmingham and District Gas Consumers Company, respecting the illuminating power of the gas supplied by the two existing companies in that town, has shown that a candle burning a large quantity of spermaceti, yields more light in proportion to the material consumed than a candle burning a small quantity. The *Journal of Gas Lighting* (London), after giving a full history of the case, remarks:—

"These experiments demonstrate that the illuminating power of burning candles increases in a greater ratio than the direct proportion of the consumption of spermaceti. It has long been known that the illuminating power of gas increases in a greater proportion than the quantity consumed, but we believe it had not been previously known that the same law operates in the combustion of candles. It is evident, from the results of the photometrical experiments with the gas supplied by the Birmingham companies, that no correct conclusions can be drawn from proportionate quantities of either the gas or spermaceti consumed, inasmuch as the amount of light is influenced by the quantity of combustible matter burned within a given time. It has been suggested that some rule may be established by which the influence on the light of the flame, produced by the relative quantities of spermaceti undergoing combustion, may be determined and allowed for. Thus, it is probable that—after the proportions have been reduced to 120 grains consumed per hour—if 1 per cent, for each grain of spermaceti the candle may consume per hour less than 120 grains, be deducted from the indications of the photometer, and if 1 per cent. be added to similar indications of the photometer for each grain the candle may consume more than 120 grains, the results attained would not be far from the truth. But until the subject has been further investigated it would not be safe to assume positively that such a scale of compensation would be correct. The new light which these experiments have thrown on photometry, shows the necessity for the adoption of some more certain standard of comparison than a spermaceti candle, the consumption of which it is impossible to regulate with accuracy. The Carcel lamp —which is similar to the 'moderator' lamp—is adopted generally on the Continent as the standard of comparison, and it possesses these advantages—the consumption of oil may be regulated with the greatest nicety, while its flame approaches in luminosity that of nine candles. At the same time, it must be observed that the lamp-wick requires great attention, and the shape and size and position of the chimney have much more influence in effecting perfect combustion than the chimney of a gas-flame. The difficulty of attaining a correct indication of the illuminating power of gas by comparison with other flames points to the adoption of the atmospheric test, invented by Professor Erdmann, which was favorably noticed in our columns on the 9th of February last. By that instrument, as we there stated, neither photometers, nor candles, nor blackened chambers, are required, the illuminating power of the gas being determined by the quantity of atmospheric air mixed with a given quantity of gas before it ceases to give white light. Such a simple method of testing the illuminating power of gas has peculiar claims to favor at the present time, as the difficulty of attaining accurate results by photometrical observations has been shown by the Birmingham experiments to be even greater than before supposed."

VINEGAR FROM WATERMELONS.—Take ripe watermelons, scrape out the inside, press out the juice, strain, and then boil it down one half; put it away the same as other vinegar, and it will make an article equal or next to cider vinegar.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening, May 12th, President S. D. Tillman, Esq., in the chair. After the usual summary of scientific news by the President—

A SPECIMEN OF THALLIUM

was presented by Dr. Parmelee, who remarked that it belonged to Mr. Luhme, the dealer in rare metals, 556 Broadway, New York. It was about the size of a filbert, and had much the appearance of lead. The outside had become covered with oxide, but on scraping the surface with the finger nail the metallic luster was exhibited.

The President asked Prof. Joy if he had made any experiments with thallium.

Prof. Joy remarked that he had repeated the European experiments. The green color of the flame is very bright and distinct, and the substance will probably come into use in making artificial lights and signal lights. It occurs in several minerals and mineral waters, and can probably be produced in considerable quantities.

THE USE OF WATER WITH FUEL

being the regular subject of the evening, was then taken up.

Mr. Stevens argued that water introduced into a fire might facilitate the transmission of heat from the fire to the boiler or other article to be heated, as moisture in the atmosphere takes the heat more rapidly from our bodies.

Mr. Stetson suggested that the presence of steam in the furnace might cause a more perfect combustion. It is stated by Prideaux and others that fifty per cent of the oxygen passed into a fire is fouudd in the smoke-stack in a free or uncombined state. And as it is a fact well known to chemists, that the union of two bodies is frequently promoted by the presence of a third, this action may take place in this case.

Mr. Dibden doubted whether, in any good furnace, so large a proportion as fifty per cent of the oxygen passes away uncombined. He believed that in smelting furnaces only five or six per cent had been found in the chimneys.

Dr. Rowell stated that he had recently examined a furnace for burning wet tan bark. At first the grate-bars were made of cast-iron, but they were so quickly destroyed that it was found necessary to construct them of fire-brick. The bark is burned in an oven, and as the flame emerges it is carried through the flues of a boiler to generate steam. Though the chimney is forty feet high the draught is very moderate, much less than in an ordinary fire with dry fuel.

Prof. Seely—"I am satisfied that in many cases where steam is thrown into fire and is supposed to be decomposed, no decomposition takes place. I am obliged to have in my laboratory nearly every day, a very intense heat for melting silver, and since so many schemes for decomposing water have been pressed upon the public attention, I have been accustomed to demonstrate, for the satisfaction of persons visiting my place, that it is only at this high temperature that water is decomposed. I have no doubt that the temperature at which carbon will decompose water depends upon the form of carbon which is employed. It is possible to produce charcoal by a certain process so that it will ignite at 600°; indeed, so that it will take fire spontaneously at ordinary temperatures, while it probably takes 3000° to kindle anthracite coal, and none of us would expect to burn carbon in its purest form—that of the diamond—in any of our ordinary fires. Now it is not probable that carbon will take oxygen away from its combination with hydrogen at any lower temperature than it will take it in its free state from the atmosphere. In all cases of elective affinity, where one element is taken from a compound by another element, there is a change in the sensible heat. When the new compound is gaseous the temperature is generally lowered; when it is solid the temperature is generally raised. This is beautifully explained by the mechanical theory of heat. The heat which disappears is expended in forcing the particles asunder—in performing internal work.

"That heat is absorbed in the decomposition of water by coal is demonstrated at the gas-works of the city of Narbonne, where water has been decomposed on a larger scale than anywhere else. The steam is superheated and the furnace is made intensely hot before the steam is introduced, but in the course of twenty minutes the temperature becomes so reduced that the decomposition of the water ceases, and it is found necessary to shut off the steam while heat is renewed.

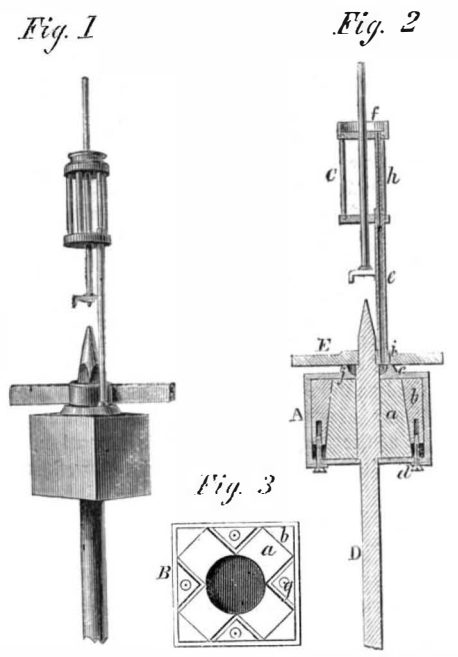
"I think any one who understands the atomic structure of chemical compounds will scout the idea of increasing the aggregate product of heat by decomposing water and recombining its elements as promptly as he would any mechanical contrivance for producing perpetual motion."

The subject of "Fuel" was selected for the next meeting, and the Association adjourned.

LANDON'S MILL-STONE BUSH.

The engravings published herewith represent a new and improved apparatus for mill-stones, oiling the spindle thereof, and keeping the same always in good order. The inventor forwards us the appended description of his invention:—

"Fig. 1, in the engraving, is a perspective view of the bush and oiling arrangement, in



connection with a spindle and driver, which are no part of the improvement, but are used to show its appearance when in use. Fig. 2, is a vertical section through the tubes and spindle, in which A is the casing of the bush, *a*, the journal blocks, *b*, the keys movable up and down by means of the set screws, *d*, to press the blocks to or from the collar, to tighten or loosen it. This may be done when the mill is stopped or running, without throwing the spindle out of trim in the least. C, is the damsel into which a tube, *h*, is fitted, opening at its upper end into the trough or gutter, *f*, and projecting at the lower end about a quarter of an inch, where it fits in the tube, *e*; D, is the spindle, and E, the driver; *c* is the top plate, which is screwed down to the wooden plugs, *g*, Fig. 3. This plate has a hole through its center a quarter of an inch larger in diameter than the collar of the spindle, and also a flange concave inside; *j* is a lid fitting the square of the spindle under the driver. This lid excludes all dust and meal from the collar. The flange forms a dish around the collar, and no matter at what point the oil tubes, *h e i*, are, in their rotation with the damsel, they still conduct the oil into this dish. A lid covers the gutter, *f*, and fits the axis of the damsel loosely so that it may be lifted with one hand and oil poured into the gutter with the other when the mill is in motion. The set screws, *d d*, have a groove cut round them, close to their heads, to receive a yoke which is slipped over them and held in position by projections on the under side of the bush, similar to those which secure the legs on stoves. By these yokes the screws are kept in place, but may be easily turned either way to adjust the keys, *b b*, which, when first made and put in, come within an inch of the bottom, to allow of being drawn down as the collar becomes loose by wearing. Fig. 3, is a view of the top of the bush with the tap plate, *c*, Fig. 2, removed to show the position of the journal blocks and keys."

This invention was patented on March 15th, 1864, by George W. Landon, of Graham, Ind. For further information address him at that place. See advertisement on another page.

THE VIBRATIONS OF ATOMS.

In the world of science, while one large class of learned and intellectual men are devoting their labor to the examination of bodies and systems of matter so vast and so remote that the mind is overwhelmed in efforts to conceive the sizes and the distances, another class are engaged in the study of the structure and habits of that innumerable multitude of organized beings which are individually so small as to be wholly invisible to the naked eye; and a third class are directing their thoughts to the size, the weight, the form, and the movements of the still smaller ultimate atoms of matter, which cannot be seen even with the aid of the most powerful compound microscope.

Among the most zealous of the last-named class is John Tyndal Esq., F. R. S., Professor of Natural Philosophy, Royal Institution, (London). Tyndal espouses the theory that all space is filled with a subtle ether, and that light, heat, and the other imponderable forces are vibrations of this ether, each force being a vibration peculiar to itself. Where heat is produced by burning hydrogen, Tyndal says that the atom of hydrogen is drawn or propelled against the atom of oxygen with a velocity and force that produces a vibration, and that this vibration being imparted to the surrounding ether, affects our senses as heat. If the collision produces vibrations shorter and quicker, these are perceptible as light.

At a meeting of the Royal Institution of Great Britain, held on the 18th of March, H. R. H., the Prince of Wales, Vice-Patron, in the chair, Mr. Tyndal read a paper on molecular physics, from which we extract the following explanation of transparency:—

"What then is the physical meaning of opacity and transparency as regards light and radiant heat? The luminous rays of the spectrum differ from the non-luminous ones simply in period. The sensation of light is excited by waves of ether shorter and more quickly recurrent than those which fall beyond the extreme red. But why should iodine stop the former and allow the latter to pass? The answer to this question no doubt is that the intercepted waves are those whose periods of recurrence coincide with the periods of oscillation possible to the atoms of the dissolved iodine. The elastic forces which separated these atoms are such as to compel them to vibrate in definite periods, and, when these periods synchronize with those of the etheral waves, the latter are absorbed. Briefly defined, then, transparency in liquids as well as in gases is synonymous with discord, while opacity is synonymous with accord between the periods of the waves of ether and those of the molecules of the body on which they impinge. All ordinary transparent and colorless substances owe their transparency to the discord which exists between the oscillating periods of their molecules and those of the waves of the whole visible spectrum. The general discord of the vibrating periods of the molecules of compound bodies with the light-giving waves of the spectrum may be inferred from the prevalence of the property of transparency in compounds, while their greater harmony with the extra-red periods is to be inferred from their opacity to the extra-red rays. Water illustrates this transparency and opacity in the most striking manner. It is highly transparent to the luminous rays, which demonstrates the incompetency of its molecules to oscillate in the periods which excite vision. It is as highly opaque to the extra-red undulations, which proves the synchronism of its periods with those of the longer waves."

BUDDING CHERRIES IN THE SPRING.—At a recent meeting of the Farmers' Club, Mr. Garrison, of Iowa, stated that he had budded several thousand trees in the spring, and with better success than fall budding. The buds start and make a fine growth the same season. The practice is especially successful with cherries, which are so difficult to make succeed by the ordinary practice. The buds are cut from scions the same as those used in grafting.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Raking Apparatus for Harvesters.—This invention relates to a new and improved raking device for harvesters of that class in which a rake is attached to an endless belt or chain. The object of the invention is to obtain a raking device of the class specified which will discharge the cut grain from the platform in a perfect manner, and from either the side or rear of the platform, according to the position in which the working parts are placed; the parts being so arranged as to cause the rake, while performing its work, to present itself properly to the cut grain while passing over the platform and to discharge the grain properly therefrom; the speed of the rake being also rendered capable of being varied or modified as occasion may require. I. C. Crane, of Edgerton, Ohio, is the inventor of this improvement.

Nail Plate Feeder.—This invention consists in certain novel means of drawing back the tongs, or their equivalent, which hold the plates, between the successive cutting operations; also in certain novel means of holding back the tongs after they have been drawn back and until the proper time for moving them forward; also in certain novel means of liberating the tongs to allow them to be moved forward by the weight or other means employed for the purpose, after the turning has been completed; and, further, in certain novel means of operating the tongs to make them raise and lower the plate during the turning operation. P. S. Bradford, of Bridgewater, Mass., is the inventor of this improvement.

Apparatus for Bleaching.—The object of this invention is to pass the fabric to be bleached through a series of vats containing the various liquors used in bleaching and to keep said fabric in each vat sufficiently long to enable the liquid to produce the desired effect, without interrupting or stopping the motion of the fabric through the apparatus. In order to obtain this object, each vat is divided in two or more chambers or compartments and the fabric is caused to arrange itself in each compartment in a serpentine pile of more or less layers, according to the time it is desired to retain the fabric in each compartment or vat; and as the fabric passes through the apparatus, the lowest layers of each pile are drawn out from the botton, while, at the same time, fresh layers are formed on the top, and the motion of the fabric can thus be continued without interruption and still each portion of the cloth remains in each vat long enough to enable the various bleaching liquors to produce the desired effect. Jeremiah Meyer, of Bay Ridge, N. Y., is the inventor of this improvement.

Evaporating Liquids.—This invention relates to an improvement in that class of evaporators of which a series of disks are employed which rotate in a pan heated with steam or any other means, and which take up a portion of the liquid contained in said pan and by spreading it over a large surface facilitate the evaporation. The invention consists in the employment of anuular rims supported by two or more arms and secured by means of these arms to a rotary shaft which has its bearings in the ends of the pan containing the liquid to be evaporated, in such a manner that on rotating said rims a portion of the liquid in the pan is taken up and caused to drip down through the open space in the center of each rim, where it comes in contact with a current of air passing or being passed through said open spaces, and by this means the operation of evaporating the liquid is considerably facilitated. Thomas Oxnard, of Marseilles, France, is the inventor of this improvement.

General Grant.

A clergyman writes from the army of the Potomac of an interview with Lieutenant-General Grant, whom he met sitting in a once elegant mansion, with a New York paper in his hand, quietly enjoying his cigar:—"Like every one else who meets him, we were charmed with his quiet, modest simplicity and manly bearing. He is a low-voiced, diffident man, with fair skin and brown hair—looks younger even than Fremont, and talks slowly, like one used to keeping his own secrets. He says he 'never had even a headache.' God grant he may have no heartache during the coming eventful month! When I rallied him pleasantly about the traditional 'cigar,' which he used as Napoleon did the snuff-box, he smilingly replied, 'When the war is over, I am going to give it up.' He has the most unbounded confidence of the troops; in every tent we hear the same spontaneous testimony."

WINTERS' CARD RACK.

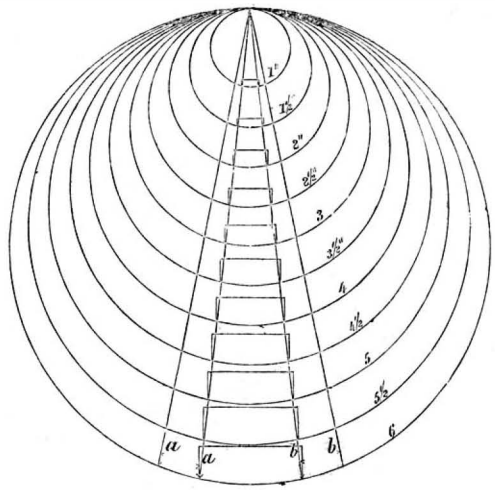
This useful device is intended to receive business cards, and hold them so that while they may be easily withdrawn by hand when required, they are not liable to be scattered about if the case should fall from its support, or be be blown out by the wind when in exposed situations. The case, A, is constructed of sheet metal in one piece, thus making it much cheaper to manufacture. The spring, B, which strikes against the cards, is bent up after the form of

the case is struck out; so also are the small lugs or guides, C, at the side, and the bottom, D, which the cards rest upon. In this arrangement of the several parts, and the general details, a neat and convenient receptacle for business cards is furnished which can be sold at a low price, and will answer the purpose admirably.

A patent is now pending on this invention through the Scientific American Patent Agency; for further information address William Winters, 805 Washington street, San Francisco, Cal.

SIZES FOR KEY SEATS.

Mr. William Edward Davies of Jersey City, N. J., sends us a diagram of a convenient plan for the sizes of key seats. It should be engraved on a brass plate and kept by the foreman or tool keeper so that the workmen may have access to it. Our mechanical



readers will understand the diagram without any explanation from us. The lines from *a* to *a*, represent the depth of the key-seat for wrought iron which in the largest size shown in the diagram is ½ inch in depth for 1¼ inches in width for wrought iron, and $\frac{9}{16}$ by 1¼ for cast-iron. These latter sizes are shown at *b b*. The dimensions of the shafts are shown by the figures at the right. We are always pleased to receive suggestions and plans for expediting work; if our readers would only impress upon the minds of every one interested in the subject the great need which exists for a standard pitch for different sizes of screw bolts and their nuts, they would do a great deal towards inaugurating a reform in the matter.

A Delicate Investigation.

Pliny Earle Chase, of Philadelphia, recently read a paper before the American Philosophical Society—*On the Barometer as an Indicator of the Earth's Rotation and the Sun's Distance.* He says:—

"On account of the combined effects of the earth's rotation and revolution, each particle of air has a velocity in the direction of its orbit, varying at the equator from about 65,000 miles per hour, at noon, to 67,000 miles per hour at midnight. From 0h. to 6h. the air has a forward motion greater than that of the earth, so that it tends to fly away; its pressure is therefore diminished, and the mercury falls. From 6h. to 12h. the earth's motion is greatest; it therefore presses against the lagging air, and the barometer rises. From 12h. to 18h. the earth moves away from the air, and the barometer falls; while from 18h. to 24h. the increasing velocity of the air urges it against the earth, and the barometer rises."

From the relation of these forces to the power of gravitation, he calculates what should be the daily changes in the hight of the barometer, and the results are found to correspond very closely with the changes in the barometer at St. Helena, the point nearest the equator where a long series of barometric observations have been made. From these changes in the barometric pressure he also computes the distance of the sun from the earth, and obtains results agreeing pretty nearly with those obtained by the most approved of other methods.

The Philadelphia Boiler Explosion.

In a further examination into the causes of the disaster at Cornelius & Baker's factory, Mr. Orr, the maker of the boiler in question, testified that he had used the available matter of an old boiler belonging to the firm. He gave some curious information concerning boiler iron. It appears from his testimony that the charcoal-hammered iron, as made three years ago, is so much superior to that now made, that the sound material of an old boiler of that date is better than most of the new iron of to-day. Before using the old iron in question every square inch of it was tested. It was as tough and sound as when it was new. Mr. Orr considered those parts of it to be the very best in the boiler. As to the other parts of the boiler where corrosion had taken place, Mr. Orr expressed the opinion that an engineer should have known of their existence by examining the boiler from the inside. He had seen boilers that corroded in two years as badly as the one in question, but the engineer should have known all about it by personal examination.

BREECH-LOADERS AND THE BAYONET.

When infantry are generally armed with breech-loading rifles, as they are doubtless destined to be, there will be an end of bayonet charges, except upon cavalry and artillery. For a regiment or brigade thus armed could pour forth such a constant sheet of bullets that they would destroy any force charging upon them with the bayonet.

Had Grant's army been furnished with breech-loaders a year ago, and drilled in their use to the present time, can there be any doubt that they would sweep away Lee's army in the first attack?

THE opinion appears to be gaining ground in England that submarine cables should be made of the lightest material. A copper wire with a Manilla hemp insulator is now recommended as the lightest and strongest, yet is heavy enough to sink. The Red Sea and Algiers cables are said to have been destroyed by heir own weight.

COMPOSITIONS of zinc and copper can be made so hard that they will cut steel and stand well for tools. We have seen a good workman two days in getting a 1¼-inch hole through a blass bell.

A FRENCH nobleman in search of a new sensation had his yacht transported to the Dead Sea on camel-back, and is now sailing on the salt.

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Correspondence

Patcnt Office Decorations.

MESSRS. EDITORS:—As your paper ought to keep the world informed about improvements in the fine arts as well as everything pertaining to the useful arts, you will no doubt feel interested in a new style of decoration for stately halls and corridors which has lately been inaugurated at the national capital. The only illustration of its peculiar character yet given, is to be seen in the Exhibition Hall of the Patent Office, which may have been selected because it would there attract the widest observation—for you must know that from 70,000 to 100,000 people annually visit the interesting relics and curiosities in those halls. The decorations of the capital, so gorgeous and profuse, have been sharply criticized, and it may be that the Government connoisseurs propose to test the public taste by means of the contrast now afforded. Whatever may be the hidden motives which caused the selection (as it is in the Patent Office, perhaps I ought to say the invention) of this style of painting, it is very certain that Congress thought that the hall which contained the precious relics of the revered Washington should be decorated, and therefore, at the last session and in the midst of this onerous, money-absorbing war, they voted many thousands of dollars for that purpose. Whether its purposes have been carried out depends upon one's idea of what decoration consists of. That the hall is painted every one—artist, connoisseur, politician, honest or dishonest, male or female—will assent to. The walls are covered with a strong yellow, too strong perhaps for a weak stomach for colors. The arches, which are the awkward, pot-bellied barrel kind, are painted in a composite style, yellow predominating; while the stumpy columns are disguised in blue, a deep blue, deeper than indigo. Perhaps the artists or the Congressional committee (if there is one in this case) call it "blue-black." The square pedestals are done in black—in mourning perhaps for the illustrious Father of his country, whose statue looks mournfully upon the floor of the hall with downcast eyes. It is supposed by some persons that the style of decoration for this hall is entirely original, and is meant to embody the national colors—red, white and blue—in novel contrast with other vivid elements of coloring matter. Others assert that it is Pompeiian, and others, again, say that it is Moorish, while some assert that it is from Africa, from Upper Egypt, or from the remains of the painted sepulchers on the Nile; one gentleman, himself an artist, contended with me that it was Indian style, from the Rocky Mountains. Whencesoever it comes, it is a fact that it is new in America, and although it may strike delicate or artistic fancies with dismay at first, yet it is believed they will soon get used to it, and be able to look upon the curiosities and relics around them and forget the paint, although it is related that an eminent authoress recently, when she had occasion to visit the copyright office, refused to pass out through that hall because it was "barbarous." X.

Washington, D. C., May 12, 1864.

The Way the Rebels get Mechanics.

MESSRS. EDITORS:—There is a great deal of wonder expressed, both at home and abroad, as to how the Confederates get workmen to make such formidable rams, as it is well known that all their male population is pressed into the army. I can tell you how it is, and hope that you will call attention to it, as it is of the utmost importance both to the Government and the people. You have heard of the starvation of our men who had the misfortune to be captured and imprisoned by the rebels on Belle Isle and at Richmond. Their sufferings have been intense, in fact they have never been exaggerated in any of the horrible tales which we have all read. Is it any wonder, then, that when the rebel authorities ask for mechanics from the Yankee prisons, with the promise of having plenty to eat with warm clothes and comfortable quarters, the chance is immediately snatched at by the poor wretches who have been suffering so long? They go to work at their various trades; some are good machinists, and others work at shoemaking and every other trade of which the rebels stand in need of master-workmen. Thus are our Government's own "guns" turned against it.

PAROLED PRISONER.

U. S. Gen. Hospital, Annapolis, Md., May 11th.

Novel Plan for supplying Gas.

MESSRS. EDITORS:—You did me the kindness some weeks ago to answer through your columns some queries in reference to the friction of gases in passing through tubes. I have made inquiries of the engineer of the Philadelphia gas works, as to experiments made there on the subject, but have not yet learned definitely to what extent their experiments have hitherto been carried. I am however informed that great discrepancies exist between the theoretical result of the problem and its practical workings. The object of my inquiry was this: the gas works in this city consume annually 80,000 tuns of bituminous coal, for which has been paid about $7 50 hitherto. The last engineer's report calculates that it will cost them $2 more per tun this year on account of the general enhancement of prices. The same coal can be purchased at the mines, about thirty miles this side of Pittsburgh, for $1 50 a tun. Now if the gas could be manufactured at the mines and conducted to the city, a gross saving of from $6 to $8 per tun, or from $480,000 to $640,000 per year could be effected. Unless the friction be an inseparable obstacle, a small main, say 12 inches in diameter, would be a sufficient conduit pipe. Such a pipe would cost (say 300 miles) about $3,000,000. An exhausting engine pumping the gas at the rate of thirty miles an hour (the rate of exhaustion assigned to the Pneumatic Dispatch Company's works in London), would afford an abundant supply of carburetted hydrogen for our city. The friction I take it could be diminished in a number of ways, by lining the main with sheet tin, &c., and by the interposition of station gas holders at various points on the line. A number of exhausters might, and probably would, still be necessary on so long a main, each one emptying the gas into one of these holders. The gas meters here also would have to be increased so as to contain say a week's supply for the city in case of leakage or accident to the main. The main to be laid along the line of the Pennsylvania railroad, over its bridges and through its tunnels, so as to be easy of access in case of accident.

I intend to look into this matter further, and bring it into shape on paper. The idea, if not new in its main features, may be as to some of its details. The gross savings in this proposed change being per year $640,000. Deduct interest on cost of 12-inch main per year, $180,000; interest on the cost of laying the main, which I have not estimated; the cost of additional gasometers and exhaust pumps. There would also be additional, but trifling expenses for wages of workmen, &c. The cost of gasometers and exhaust pumps would be counted by tens of thousands of dollars and not by hundreds of thousands. But at first blush there would seem to be an annual saving of some $200,000—perhaps $300,000—*i.e.*, the interest on from three to five millions of dollars. The works as they now stand are taxed to their full working power, there will be a necessity for an additional supply of gas soon. The proposed change would not only cheapen the gas used by us but enable us to supply intermediate cities and towns from station gasometers, and would also remove from the heart of a populous city works universally felt to be a tolerated nuisance in their own neighborhoods.

I have heard that some European inventor has learned to manufacture gas mains from bitumen, and I understand that Thurlow Weed is the purchaser of, or agent for the patent right in this country. Do you know whether such is the case and what would be the comparative cost and utility of such pipes?

Though the foregoing ideas are but hastily thrown together, and perhaps but crude at best, they may probably be of interest to you. If the inhabitants of London pay but $1 or $1 25 per M. feet for gas, why should it cost us $2 50 per M? X. Y. Z.

Philadelphia, Pa., May 5, 1864.

[One manifest objection to this plan is that the market for the surplus coke would be lost.—EDS.

How to render Leather Vermin-proof.

MESSRS. EDITORS:—By a recent dispatch from California, we notice that some $200,000 worth of boots and shoes were destroyed by cockroaches on a vessel hence to that place. It may be of use to those interested in shipping boots and shoes, leather in bulk, or manufactured in any of its varieties, to know that an application of castor-oil will render leather vermin-proof, at the same time it is as good a dressing, if not better, to preserve it as there is known. It may be mixed with tallow or other oil if preferred, say half and half. Having resided in Cuba (where roaches, rats, and other vermin abound) and having had care of leather belting, fire-engine hose, horse harness, etc., I have found its application entirely effectual; no vermin will touch it. F. W. B.

New York, May 12, 1864.

The "Chenango" Boiler Explosion.

MESSRS. EDITORS:—I notice on page 283 of the SCIENTIFIC AMERICAN, current volume, you refer to this case, and I now wish to say a few words in addition. In the Coroner's summing up he says that it was conclusively proved that the iron in the boiler was good. The Coroner of course speaks according to the evidence brought before him; but having seen the plate that gave way, I beg to say that it is very far from good iron. The third rivet from the place where the boiler gave way has cracked the plate more than two inches on each side of it. This crack, bear in mind, was not caused by the explosion, and iron of the quality that ought to be put in these boilers would not have split in that manner, nor should such a boiler ever have been allowed to leave the shops. Bad iron in the plates, and possibly bad iron in the stays, and certainly an insufficient quantity of them, appear to me to be sufficient to cause explosion on any boiler however made. It is simply absurd to say you cannot stay Martin's or any other boilers. If any boiler did happen to be so peculiarly constructed as to require a certain number of stays where they could not possibly be fixed, that boiler ought never to be used; and only a man who did not understand his business would ever design such an one. If Martin's boilers are really good, but have not steam room enough, put a dome on them sufficiently large to make up for the deficiency, and high enough to prevent any water getting near the top by foaming or any other way, and take the steam from thence to the cylinders, through a solid pipe, either in or outside of the boilers. Do not condemn them simply because they are used in the navy, as I see a good deal of feeling exhibited in that way, instead of sticking to the subject in hand and trying to solve it, and perhaps suggesting a remedy. ENGINEER.

New York, May 13, 1864.

[A dome would be an obvious remedy for the trouble spoken of, but in the case of war vessels it is inadmissible. We do not know what our correspondent means by "a solid pipe."—EDS.

Will Sudden Relief from Pressure cause a Boiler to Explode?

MESSRS. EDITORS:—In a recent number of the SCIENTIFIC AMERICAN I noticed a statement that a series of experiments were to be conducted to ascertain, if possible, the actual cause of steam boiler explosions. Now I suppose actual occurrences, whether accidental or incidental, are equally valuable. One such accidental experiment lately came under my observation. At the lumber mill of Messrs. A. A. Soule & Co., at Ullin, Ill., a small locomotive, used to stock the mill, haul lumber, &c., while passing over their road, where the same is laid through heavy timber land, encountered a leaning tree which knocked off the smoke stack, safety valve, &c. The steam and water flew out of the opening to a hight of forty feet. No explosion, on the principle of flashing into steam, followed on the sudden removal of pressure. The pieces were gathered up, more water obtained, and the "institution" went on its way rejoicing. The usual running pressure is from 75 to 100 pounds; sometimes, without load, as low as 50 pounds; which latter pressure, I think, was about the pressure on this particular occasion. E. R. H.

Bloomington, Ill., April 27th, 1864.

LUSUS NATURÆ.—A mare belonging to S. Whipple, of San Mateo, Cal., gave birth to a colt with a camel's head, on Friday last. Mare and colt both died. She received a fright some months since, from a drove of camels belonging to the Government, while on their way from the lower country. Who shall say that horses are not possessed of imagination?—*San Jose Mercury.*

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THE CORK!

There are few things in common daily and manifold use, of which is so little known as cork. Some think it is a kind of a bark and grows in the woods, others that it grows under water like the sponge, and we have even heard the belief expressed, that corks grew on trees like plums and pears. It is an article indispensable to every household—is used in cellar and kitchen, and found in every sick room; druggists, chemists, and liquor dealers consume great quantities; it is used by nearly all mechanics, forms part of the manufacture of various articles of clothing, such as hats and shoes for winter; lastly, fishermen use it for their seines, and it preserves our lives when in danger on the water. Does not such an useful, so versatile an article, which has no substitute nor ever will have, deserve to be known better?

The cork tree, or cork oak, *quercus suber*, belongs in botany to the same class as the rest of the oaks, bears acorns, and only differs from them by giving less shade and looking less fresh, owing to its bark being clipped so often. This bark is the cork wood, and out of it the corks are cut. It was known and much made use of by the old Greeks and Romans.

In modern literature, even in geographies and traveling guides describing all the peculiarities of a country, the cork tree is never mentioned. On the steamer going over to Europe, I made the acquaintance of a Spaniard, from near Madrid, who did not know that the cork grew in Spain, and in the railroad cars from Cadiz to Seville, I conversed freely with a gentleman from Cordoba, who had traveled and seen and knew a great many things, but never heard of such a thing as a cork forming a branch of trade and growing and being manufactured in Spain.

This wonderful tree only grows in Europe, in Spain, Portugal and Sicily, and to some extent in parts of southern France, and also in Africa near Bone, Algiers. All efforts to transplant it to our country to parts of the same geographical and terrestrial condition, have proved futile. It has an accommodating way of growing best and producing the finest cork in the most sterile ground. So it is seen in the Pyrenaees on the top of mountains between nothing but rocks and stones. The acorn is planted, and after the sapling has grown into a tree of about five inches diameter, say after ten years more or less, it is for the first time stripped of its bark, but not more than two feet from the ground. The stuff obtained is good for nothing and is called "the savage." After another eight or ten years it is stripped again and this time double the former length from the root, and so successively until forty years of age, when it is stripped from the root to where the branches beigin to expand where the bark is always of the finest quality hereafter. The second growth is little better than the first, it is used for seines and other rough purposes, but the third commences to be good. For this reason so little is planted, as it takes nearly fifty years before the tree yields a full crop, but once in operation the tree lasts centuries. It is the greatest dividend-paying property on earth, as it wants no looking after, no nursing, only to be clipped every ten years. The cork is stripped to what is called "la camisa," the shirt of the tree, a tender sort of a second bark, which is blood-red, and if slit open or partly cut, causes the whole tree to die off. This red color lasts about ten months, after which exposure and the growth within thicken and strengthen the bark and after a year or two it assumes a rough and furrowed grey-brown appearance. The crop is made on an average every ten years, the bark growing in thickness less every year, and after it is stripped, the thickness plainly indicates the age by fine lines, running parallel with each other, a line to each year. The space between the outer bark and the first line is often a quarter of an inch wide, as the first year knows of no impediment and pressure, and thus the bark grows most, the space between the next years is smaller and so on up to the last, which, if the bark is between twelve and fifteen years old, dwindles down to a line. In fertile bottoms or plains the bark is often fit to be stripped after five or six years, is thicker than the one raised on the mountains of double age, but the quality is very inferior. The best cork wood grows in Cataluna, Spain, in the province of Gerona, and it is at present, almost exclusively from any other wood, used for champagne corks, and the preference given to it in that quarter ought to be decisive. The mouth of a champagne bottle is a little over half an inch wide, and the cork popping forth, fully 1¼-inch in diameter, must certainly be soft and subtle to admit such pressure by machines.

The manufactured cork forms the main export article of Cataluna and amounts to millions in the year, but the exportation of the cork wood is prohibited by law since many years, when the English bought up all the wood they could get hold of, and to such an extent, that the native cork-cutters had no more wood to work on. A riot ensued and the Government made the law prohibiting export. Since the manufacture of champagne has assumed such enormous dimensions (over twenty millions of bottles are put up every year), the Catalonian wood has steadily risen in price and costs now double to what it did ten years ago, what formerly sold at three cents of our money for twelve ounces (the Spanish pound), is scarce at present at six and eight cents. All the proprietors of forests have become rich, a great number of exporting houses have made fortunes in corks, while the small manufacturer has to sell at the same price as formerly, and the only way of extricating himself is to deteriorate the qualities. What was formerly thrown away, is now manufactured into a low grade of goods, and what was once second quality, is now considered and sold as first. The proprietors have become wealthy from poor laboring men, for fifty years ago the world at large was not so thirsty as it is now, very few corks were used, and their lands unfit for agriculture, worth almost nothing; they now have everything their own way, in every instance exact cash down, take only gold in payment, and only whole ounce pieces of full weight at that; some give the manufacturers, who buy on the spot and often come from a distance something to eat, others do not, but all compel such buyers, who live on the Mediterranean shore, to bring plenty of fish along with them. The cork-wood is sold by cords, at sight as we might say, formerly the proprietors heaped up liberally, so that the buyers often obtained a bargain. While now a-days, if there is any difference or a mistake made, it is certain to turn out in favor of the seller.

There are immense forests of cork-oaks in Sicily, but the deplorable social state of things in this island threatens to be the cause of the entire destruction and annihilation of these woods, for the owners of them, afraid of going into them for fear of being assassinated, have commenced to hew them down. In Sicily there is some very fine wood obtained also from trees in valleys and bottoms. The Andalusian wood is mostly of an ordinary quality, it wants a fresh color, so that often the manufactured corks look as if they were soiled by muddy water. The great fertility of the soil is, no doubt the cause of this. Portugal exports enormous quantities of cork wood to all parts of Europe and America; Germany receives thence wood, out of which those superfine small tapered vial corks are made, called from their diminutive size, homœpathic vial corks. The wood is best for use after it has lain a few years, although some use it in a fresh state. A cork made out of well-seasoned wood, if put in luke-warm water before bottled, swells out considerably, developing its spongy nature. The corks are all cut by hand, from the smallest vial cork up to the champagne and bung cork, with very large knives of about ten inches long and three and a half inches wide. In the United States, where they use machines for everything, they cut corks by machines which do very well for vial corks and flat jar corks, but will never supersede hand-craft. For the cork machine goes on cutting the strip from one end to the other, while the workman does not waste his time on a bad place that may be in the middle of the strip, he cuts it out and throws it away, the machine also takes away from the outward appearance of the cork, it leaves it "fuzzy," while the cork well cut by hand has a rich luster and velvety softness.

[Mr. Kapp is not well informed on cork-cutting machines, however accurate he may be on the corks themselves.—EDS.

The cork cuts under the machine beautifully, if soaked in oil, but English chemists have tried in vain to find out something which will take the oil and grease out of it afterwards. There are men, boys and women (the latter not generally however) employed in Spain in cutting, assorting, washing, counting and packing. The principal manufacturing villages, where nearly every house is a cork shop and all the streets and empty lots, are lined and heaped up with the waste of the stuff, for they cannot burn all.

The finest qualities of bottle corks nearly all go to England, where a better price is obtained for them than any where else. France and Germany use the quality next, and what is left after that, goes to America. This is quite natural; in England they bottle those fine Port, Madeira, and Sherry wines intended to keep for generations to come, and also send their ale to China; they want a different cork than we do for our soda-water and ale, &c., which is bottled only for a day or two. The Ohio and California wines however have of late been so improved, and in such quantities been put up in bottles, that by-and-by we will also come in for a share of the fine qualities of corks. In champagne corks we also only buy what they reject in the champagne districts, where some houses pay as high as 200 francs for 1,000 corks, which, if imported into the United States, would cost in New York, freight, duty and exchange added, ten cents a piece, but our manufacturers do not want to pay more than five or six dollars a gross, and therefore must be content with an article for 60 or 70 francs at first cost per M. The manner in which these champagne corks are treated is a perfect humbug; they are boiled and washed and put from one kettle into another, spread out to dry, then picked out and once more boiled and washed, &c., and every manufacturer pretends to have his own secret for detecting such as will leak. They are all sent to the champagne *en bruto*, the second stage of the cork under the knife. Out of the strip of wood it is first cut rectangular, then octagon, and lastly "*repasado*," *i.e.* rounded. For this latter purpose, to have the cork as clean and beautiful as possible, every house in the champagne employs its cork-cutters, and many of these, as well as the head bottlers, receive a certain bribe from the sellers, in order not to say anything against the cork.

It is said that the Chinese have taken a liking to ale and lager; if they commence in their celestial sphere to brew and bottle, then beware! for they will consume all the corks that can be produced and manufactured. It was a standing joke between the buyer and seller in Spain when prices could not be agreed upon, to keep the goods until the Chinese would come in the market.—*Otto Kapp.*

The Gyrascope Top.

A correspondent at Newark sends a drawing of this top, saying that he has seen it stated that the principle on which it works has never been fully explained. We gave the following explanation of the principle on page 193, Vol. III. (new series) of the SCIENTIFIC AMERICAN:—"If a stone is tied to the end of a string and whirled around rapidly from the end of the finger as a center, and a piece of paper held at an angle is brought against the stone sideways, tending to divert it from the plane of its revolution, the stone will resist this diversion and will pass through the paper in its effort to continue to revolve in the same plane in which it was first started. Let a number of stones be fastened together in the form of a wheel or disk, and caused to revolve around a common center like a wheel on its axle, and each one of the stones will resist any effort to turn it from the plane of its revolution in the same way as the stone first cited. Thus the momentum, or inertia, of matter causes a revolving wheel to resist any effort to deflect it from the plane of its revolution; the resistance being in proportion to the weight of the wheel and the velocity of its revolution."

Royal Example in Economy.

Queen Elizabeth of York, the wife of Henry VII., though she paid the board of her married sisters to their husbands, and furnished her maids-of-honor with gambling money, practiced the personal economy of having her own dresses turned and mended. Henry VII. was the English king to whom Columbus applied for aid in his great adventure.

AN enterprising but ignorant South American has sent to an Albany locomotive-shop for one hundred "cow-catchers." He expects to use them in taking wild cattle on the plains of Paraguay, in place of the lasso.

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Improved Hoop, Lock.

The usual method of connecting barrel hoops so as to form a continuous circle is well known to most persons. The preparation of the hoops occupies a great deal of time, and is not only costly but insecure. Our engraving represents a new method of attaching the ends of hoops to each other so as to make the process cheaper as well as stronger. The end is attained by providing a simple metallic clasp, A. This clasp is punched out of sheet-iron, and so set as to allow the ends of the hoops to be passed through slits, or recesses in it. The ends are easily pushed in, but cannot be withdrawn readily, as the sharp edges of the clasp bite against the wood at an angle and prevent the same from slipping back. A blow with a hammer suffices to turn the outer ends over so that a neat and handsome appearance is presented and the hoop, as thus formed, is far stronger and less liable to slip or lose its hold than the ordinary kind.

This device was invented by H. W. Catlin, of Burlington, Vt., to whom a patent is ordered to issue through the Scientific American Patent Agency, and further information can be had by addressing him as above.

CATLIN'S HOOP LOCK.

The Best Whitewash.

Mr. Uriah Ritchie, well known in Boston as a master-builder, and one of the owners of the immense building in New York in which are located the offices of the Scientific American establishment, gives to us the following recipe for whitewashing. Mr. Ritchie is a practical and successful mechanic in the broadest sense, and after forty years' experience at mason-work, and after having made a great many experiments in the art of preparing whitewashes, he comes to the following conclusions:—

First—For rough outside walls—those exposed to the weather—the best mixture is clear lime and water. Any animal or vegetable substance added diminishes the adhesion and durability of the wash.

Second—But if the wall is hard and smooth, the wash is improved by a mixture of very fine sand—as much as will mix and can be applied.

Third—For inside walls an addition of a little glue—say a quarter of a pound to three pailfuls—increases the adhesion. If it is desired to have the walls very white, the whites of eggs may be used in the place of the glue.

Improvement in Hanging Car Bodies.

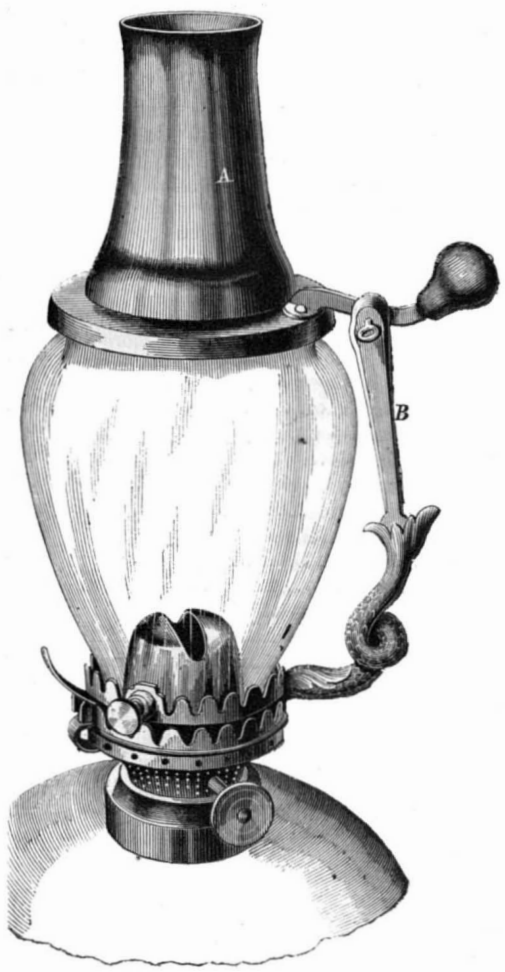
The Boston horse railroads have an improved method of connecting the bodies of their cars with the trucks, to avoid the jolting going over any obstruction upon the rails. At each end of the truck there is a rubber spring held firmly in position by a pedestal fastened to the body of the car, and resting on a bracket shelf on the side of the journal box. Fastened to the truck is a steel spring in leaves, the smaller end of which is held at the top of the rubber spring by a bolt or suspension rod, which passes through both springs and is fastened to the lower part of the hanging pedestal. There is sufficient play and elasticity to obviate the blow coming from any direction. The weight of the car is divided between the springs, one supporting the other, thus producing a gentle, easy, swaying motion, extremely agreeable and perfect in comparison with the heavy, grinding rumble, and rigid hard shocks of the common arrangement now in use.

Coating Iron with Aluminum.

Mr. Wm. Clark, of England, has invented a peculiar process for covering the surface of iron with a layer of the above metal. The surface of the iron is first cleansed; a mixture is then made of porcelain-clay, feldspar, and white lead, properly ground and incorporated; then about ten parts of this combination are added to about five pounds of calcined and powdered alum-clay. This last mixture having been made into a thin paste, and poured over the surface of the metal, the latter is dried and placed in a reverberatory furnace until it presents a glazed appearance. When the iron is removed it will be found to have received a tough, adhesive, and elastic coating, which is so closely attached to the metal that, when this is bent even at right angles, no symptoms of cracking appear. This coating is also unacted on by acids and alkalies. It is supposed that during the baking-process the aluminium is separated from its oxide and forms a thin metallic stratum, intermediate between the iron and the glazed surface.

COLBURN'S BRACKET LAMP CHIMNEY.

It is well known that the ordinary glass chimneys used for kerosene lamps break very easily and are a source of continued expense and annoyance to renew them. The metallic top added to the chimney herewith illustrated is intended to prevent this trouble, and they are highly spoken of by those who have tried them. They can be used on any kind of burner and with any sort of fastening. We have made an experiment with a sample chimney of this kind, and find that it answers the purpose intended. The inventor says, concerning his chimney:—



"It is constructed on an entirely new principle. The metal top is not fastened in any way to the glass, but to a bracket attached to the burner. Its advantages are, that the glass portion has no metal fastened to it to cause it to be broken by heat unequally expanding it, or to convey the heat from the metal top down the glass to the oil, endangering explosion; the heat of the metal portion is conducted away from the glass by the bracket, B, which also serves as a handle to remove the chimney when hot. The top can be turned off so that the wick can be lighted at any time without removing the chimney.

Patented on the 14th of April, 1863, through the Scientific American Patent Agency. Further information concerning the sale of rights, etc., can be obtained by addressing W. S. Meeker, 34 Mercer st., Newark, N. J.

How Granite was Formed.

In delivering one of the lectures of the Swiney course at the Royal School of Mines, Dr. Percy objected to the assertion of geologists, that granitic rocks must have been formed by plutonic agencies, for, said he, there are certain difficulties which have always been in the way of accepting this view of the subject—difficulties known at all events to those who have been accustomed to make experiments on the fusion of mineral substances at high temperatures. This is especially seen by examining the condition of quartz in granite; it is always found in the crystalline condition, and has invariably a specific gravity of 2·6. There is not a single instance known to the contrary. Hence there is reason to believe that the quartz could never have been fused, for the moment silica is fused, no matter in what condition it was previously, a peculiar glass-like colloidal mass is produced, having a specific gravity which never exceeds 2·3. Therefore there is good reason to conclude that granite could never have been found under the condition of a high temperature.

SPIRITS OF TURPENTINE.

The very high price of spirits of turpentine, resulting from the war, is causing great efforts to be made for producing it at the North. There are very large numbers of pitch-pine trees in many portions of the Northern States, and we are having inquiries from correspondents of the proper mode of procuring turpentine from these trees.

The method of procuring pitch from the pine trees of North Carolina is to chop a box or pocket in the trunk of the tree. A long-bladed ax is used, the lower lip of the box is made horizontal with a deeper portion in the rear, and the upper surface is inclined; the box holding from one to three pints. From one to three boxes are made in a tree according to its size. The boxes are cut during the winter, and the pitch begins to flow about the middle of March. A thin shaving of wood must be taken from the top of the box once in eight or ten days so as to expose a fresh surface. The sap is collected by means of ladles from the boxes as they become filled, and deposited in barrels.

The spirits of turpentine is obtained by distilling the pitch in stills similar to those used for distilling ardent spirits. The article may be purified by a second distillation with caustic soda or potash.

Falling Up.—When the moon is overhead it is difficult for us to conceive that if a cannon ball was fired at us from the central portion of the moon's disk, it would rush down towards us a short distance, and then turn backward and fall up to the moon again.

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PATENT CLAIMS AND PATENT BUSINESS.

It is our intention, hereafter, to publish the official list of claims of patents one week earlier than usual.

In this connection we would also state that, owing to the large increase in our Patent Office business—which amounts to nearly one half of the entire business of the country in this line—we are obliged to increase our facilities. We have secured valuable and experienced assistants in this department, and are now better prepared than ever before for a large addition of cases, and a correspondingly prompt attention to them.

Through our efficient Branch Office at Washington we have made nearly eight thousand preliminary examinations into the novelty of new inventions. We have efficient assistants constantly at the Patent Office giving personal attention to our cases; and thus, with our additional force, we shall, as heretofore, give every possible facility to all inventors who intrust their cases in our hands.

TYNDAL ON BOILER EXPLOSIONS.

The remark of Tyndal, which was used by one of the witnesses on the inquest into the *Chenango* disaster, to support his theory of boiler explosions has, in fact, no bearing on that theory.

It is a well-known fact that when water has been deprived of its air, by boiling or otherwise, its boiling point is raised much above the temperature at which it boils in its ordinary condition. But in order to prevent it from boiling at this high temperature it must be kept in a perfectly quiescent state; as soon as ebullition commences, enough of the liquid flashes into steam to absorb and render latent the surplus heat in the water, and bring it down to the ordinary boiling temperature.

Tyndal, in his recent work on heat, drops the remark in passing that this property may account for some boiler explosions; and there is certainly force in the suggestion, though it could apply to those cases only in which the boiler bursts at the instant of starting the engine.

But water is very different from superheated steam as a reservoir for heat. At a pressure of 33 lbs. to the square inch a pound of steam occupies 758 times as much space as a pound of water, and as it takes about twice as much heat to heat a pound of water one degree as it does a pound of steam, a cubic foot of water holds 1,500 times as much heat as a cubic foot of steam. It is true that steam holds a large quantity of latent heat which would be given up if the steam was condensed to water, but if this operation should take place it would reduce the pressure and prevent an explosion.

HOLES IN FURNACE DOORS.

Nearly all the fires that are seen in the common operations of life are the burning of hydrogen or carbon; this burning being the combination of these elements with the oxygen of the atmosphere. In examining the chemistry of our ordinary fires, therefore, we have three elements to deal with, hydrogen, carbon, and oxygen. The proportions in which they combine are of course in accordance with their atomic weights. The atom of carbon weighs 6 times as much as the atom of hydrogen, and the atom of oxygen 8 times as much.

Hydrogen—H	atomic weight,	1
Carbon— C	atomic weight,	6
Oxygen— O	atomic weight,	8

In burning, 1 atom of hydrogen combines with 1 atom of oxygen to produce 1 atom of water. Water, therefore, contains 8 lbs. of oxygen to 1 of hydrogen.

Carbon combines with oxygen in two proportions. One atom of carbon combines with one atom of oxygen to produce one atom of carbonic oxide. And one atom of carbon combines with two atoms of oxygen to produce one atom of carbonic acid. Thus by the action of fire the three elements are combined to produce three compound substances.

HO—Water	atomic weight,	9
CO—Carbonic oxide	atomic weight,	14
CO_2—Carbonic acid	atomic weight,	22

The second atom of oxygen in carbonic acid is held with much feebler affinity than the first, and is taken away if brought in contact with carbon at a high temperature; thus reducing the carbonic acid to carbonic oxide, and forming a second atom of carbonic oxide.

$$CO_2 + C = 2\ CO.$$

When air enters a mass of burning coals at the bottom, its oxygen burns the carbon with which it first comes in contact into carbonic acid, and as this gas struggles upward through the mass it is reduced to carbonic oxide. The oxygen that is set free then combines with the carbon of the coal to produce a further supply of carbonic oxide.

If this carbonic oxide on its escape from the mass of coals finds no free oxygen, it passes away into the smoke-stack and escapes unburned into the atmosphere. But if the space in the furnace above the coals is filled with atmospheric air at a high temperature, each atom of the carbonic oxide will combine with an atom of oxygen, forming again carbonic acid.

It has been ascertained by careful experiment that a given quantity of carbon will generate more than three times as much heat by being burned to carbonic acid than it will by being burned to carbonic oxide. According to the latest determinations of Andrews 1 lb. of carbon in burning to carbonic oxide will heat 2,228 lbs. of water 1 degree, and in burning to carbonic acid it will heat 7,900 lbs. 1° (centigrade).

It has also been ascertained by direct experiment that when the ultimate products of combustion are the same, the amount of heat generated is the same whatever decompositions and recombinations may take place in the course of combustion.

It is only in badly-constructed furnaces that a very large portion of the carbon goes away as carbonic oxide, and that consequently a corresponding economy would be found in making holes in furnace doors. But the above facts in the chemistry of burning show the great importance of perfect combustion.

A VERY curious book has been published by Trübner, the well-known English publisher, on the "current gold and silver coins of all countries," with nine hundred *fac simile* illustrations in silver and gilt. Among the curious facts which it brings out is the one that the Austrian dollar coined at the present day is the exact copy of the dollar of Maria Theresa, of 1780, then struck for the Levant trade.

WE are indebted to the Hon. James Brooks for a copy of the new Navy Register.

BEARING SURFACES.

The economical working of machinery depends upon many things—the care observed in using it, the material employed in its construction, and, lastly and chiefly, the proportions of the design; for good workmanship, material and careful supervision may, for the purposes of discussion, be assumed. The resistance of every machine is very greatly increased or diminished according to the harmony of proportions existing between the several principal parts. The labor of the shaft, the burthen on the beam, the wear and tear of cylinders and packing rings, the duty borne by the guides in sustaining or directing the cross-head, all these points have some importance in the general economy of a steam engine. So also does want of proportion affect the performance of other machines when transferred to them, and the best test of durability, and as a sequence, economy, is found in engines which have run for years without repairs—equal engineering skill and similar conditions being assumed for the purpose of comparison.

If we examine the V-shaped slides of a planing machine we shall find that they do not wear equally, considered through their cross-sections, and that in most cases the points which wear the most are nearest the top of the slide or at its apex. The base on each angle is always the brightest, showing that the most friction occurs at those points. One reason for this may be found in the shape of the wearing surfaces; the form is so unfavorable to lubrication that oil will not remain upon it very long, but runs down toward the lowest parts, carrying with it the dust that may have settled on the slides. Instead of making the slides in this way, it would seem a better plan to cut off the top of the triangle (considering the slide through its cross-section) so as to transfer a portion of the wear which the lower parts of the inclined sides sustain, to a flat or plane surface. By this method of construction, which is often practiced on the shears of lathes, the wear would be more equal and even, and the slides would last longer without replaning. Many makers of planing machines extend the base of the slides very much, so as to make wide and heavy bearings, and this plan has been found to answer well on large machines. We once saw a planer with slides which were semicircular or rounded on the top and they worked very badly indeed. The sides of the semicircle, if we may use such an expression, wore off much quicker than the top, and the consequence was that the surfaces in contact never fitted.

The journals of steam engines are very often made convex in their axial length, some are made concave, and still others have coned bearings to certain parts. These plans are all defective for these reasons:—the wear is unequal because the velocity of the surfaces in contact is unequal; the pressure upon the bearing is not the same throughout the surface; the lubrication is imperfect, because the oil flows from the highest to the lowest points, so that in a short time the greatest diameters are left dry unless more oil is poured on than a journal of similar size properly made should have. Any departure from a true cylindrical surface is costly to manufacture, while the use of such journals is not attended with advantages sufficiently great to counterbalance their evils except on traction engines, some parts of quick-working screw engines, or places where great strain is liable to be thrown on the parts connected—as in long connecting rods or self-propelling engines for common roads.

Quick-working screw engines, having short strokes and the crank shaft so near the cylinder-head that it makes the latter squint-eyed to look at it, wear down their gibs in the cross-head (when they have any) most rapidly, and no remedy for this appears to exist but to make the gibs either of hard-wood boiled in linseed oil or else brass, disproportionately large for the area of the piston. Wooden gibs wear while the slides do not, which is a very important advantage. We have seen the gibs of a cross-head belonging to a direct-acting vertical screw engine (said gibs being of brass, about 14 inches long by 8 inches wide) worn down nearly three-quarters of an inch on their face in going from this port to Savannah, Ga., in spite of all the oil that could be poured on, or attention that could be given them; it may be proper to state that the cylinder was about 50 inches in diameter and the stroke 48 inches. As an economical substitute for small brass boxes, lignum-vitæ boiled in oil or

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tallow is very good, and is used to some extent for many quick-running machines. These boxes last a long time and are easily replaced when worn out. A large and heavy screw engine is now building at a machine-shop in this city; the main shaft of this engine runs in cast-iron boxes well lined with Babbitt metal, but no composition of any other kind is fitted to the journal. These two metals work well together when the journals are not very large, but if we are not greatly in error this same arrangement was placed on the engine we alluded to a few lines previously, and caused so much trouble that it had to be taken out and replaced by brass boxes.

Of two evils it is far better to give to much bearing to the working parts of machines than too little, for the repairs in the first instance will bear only a proper relation to the amount of work done, while in the latter they are a continual item of expense.

WILL SUDDEN RELIEF FROM PRESSURE CAUSE BOILER EXPLOSIONS?

Many instances are on record where boilers have been suddenly punched by the bow-sprits of vessels, and thus relieved of great quantities of steam and water in a very short space of time. The *Mound City*, a gunboat on the Mississippi, had a shot through her boilers which caused large volumes of steam to escape, scalding numbers of the crew, yet no explosion followed, the water was not "flashed into steam," neither did it, as theorizers say it should have done, become converted into a huge projectile and dash away the surrounding walls of the boiler like so much paper. Every day a most mischievious practice may be observed in commercial cities; the safety valves of steamers arriving from sea, or from inland waters, are suddenly lifted, and the mighty force pent up in the boiler shoots out into the air with a deafening roar. Is not this a sudden relief of pressure? It is so sudden that the index hand of the steam gage goes back almost as fast as the pulse beats, and ten minutes are enough to blow the steam from the largest boiler. The practice is, as we remarked, a mischievious one, not upon the theory that sudden release of pressure is attended with danger; but because the boiler is unduly strained. The whole force within is directed upon one part and that suddenly, and it is wonderful that so few accidents occur from this practice.

The occasions have been neither few nor far between, during the war and previous to it, where the boilers on gunboats have been pierced with heavy shot. The *Sassacus*, one of the new double-enders, having a large Martin boiler of the same kind as the one which exploded on the *Chenango*, was recently struck with a one-hundred-pound rifled shot which passed entirely through the boiler. The sudden escape of steam scalded many of the crew, but beyond the perforation there was no casualty to the boiler itself. From this, and the other cases we cited, it may be seen that the particular theory queried in the caption of this article must be at fault. Why is it not better in striving to account for boiler explosions to look first at purely mechanical causes? When the piston rod of a steam engine breaks men say it was too weak, or from such and such a specific cause (as water getting in the cylinder, or a follower bolt coming out and getting jammed between the head and piston), a violent strain was put upon it which it was not capable of withstanding. No one thinks of examining the chemistry of heat, of the oil which lubricated it, or of the packing which surrounded it to account for the rupture; and any one who should propose such a course would be looked upon as an idiot by his professional brethren. Because the disengagement of steam from water is both mechanical and chemical, when a boiler bursts some men seem to have passion for diving into the most profound and absurd theories, and descant about matters they know nothing of, when a defective brace or a rotten sheet was most probably the source of all the trouble.

There is great mischief in attributing boiler explosions to obscure causes, for by so doing we make practical engineers, who are not versed in the "mysteries" of their art, believe that all their care is of no avail, and that, precaution or no precaution, an explosion is sure to occur, provided a certain chain of circumstances is produced in the boiler. Let us look first, and earnestly, at the mechanical construction of steam boilers, and if it is settled that no improvement can be made in this respect, turn our attention to theories and the tedious discussion of them.

THE SLIP OF PROPELLING INSTRUMENTS.

"Slip" is a technical term, used by marine engineers to designate the receding of the water from the float of a paddle-wheel or the blade of a screw. The float or blade moving against the particles of water in order to obtain a resistance to react in propelling the vessel, obtains this resistance, but at the same time the particles of water do not remain stationary but recede or slip away from the propelling instrument. Hence, on account of this yielding property of water, the propelling instrument must move against a greater number of particles or molecules of water in order to obtain the required amount of resistance. The resistance offered by a single particle of water to a propelling instrument, decreases just in proportion as it yields to the motion of the propelling instrument. If the water did not yield at all, then its resistance would be greatest; but if it yields to the least possible force, then its resistance is of the least possible amount.

Let us illustrate the loss by slip, by means of the following example:—Let the center of pressure of a propelling instrument, have an effective velocity of 120 feet per minute, and the velocity of the vessel be 100 feet per minute. Then, making the following proportion to obtain the loss by slip, we have the loss of speed by slip expressed in per-centage, thus—

As the speed of the propelling instrument = 120
: the difference between this speed and the speed of the vesel (120—100) = 20
:: 100
: the slip expressed in per centage = $16\frac{2}{3}$

Hence, $16\frac{2}{3}$ per cent of the speed of the propelling instrument is lost on account of the yielding property of water. However, from this it seems to me to be impossible to deduce that there is $16\frac{2}{3}$ per cent of the amount of the power which has been transmitted to the propelling instrument, lost by the water thus yielding or slipping away. This loss of speed simply represents the number of extra particles of water the propelling instrument must come in contact with in order to obtain the required resistance. Or it represents the extra number of revolutions the engine must make, in order to move the propelling instrument against this extra number of particles of water. If the water did not yield in this manner it would require more steam or power to move the engine during each revolution, but as the water does yield or slip away from the propelling instrument, then the power required for each revolution is decreased in nearly the same ratio. Hence, when we can determine the amount of power expended in overcoming the friction, and other resistances of the machinery itself, in causing the propelling instrument to move against this extra number of particles of water, in order to meet with the required resistance, then we can obtain the actual loss of power by slip. Now this amount of power thus expended, would not by any means equal the per centage of the loss of speed by slip as ordinarily estimated.

I have thus endeavored in a few words to give this explanation of the loss of power by slip as I understand it. This is not the generally received theory, however, for it is taught by many of the most prominent marine engineers, that the apparent loss of speed by slip as expressed in per centage, is the true loss by slip of the amount of power which has been transmitted to the propelling instrument. Thus, in our example, it would be said that the loss by slip of the amount of power which has been transmitted to the propelling instrument would be $16\frac{2}{3}$ per centum; while I would endeavor to prove that this loss would only be the power expended in overcoming the friction and other resistances of the machinery itself while making the extra revolutions required to make the propelling instrument come in contact with this extra number of particles of water; which loss might possibly be no more than 2 or 3 per cent.

In discussing this subject it should always be borne in mind that the apparent slip of a screw is not the actual slip, as it is well known, that instead of the screw revolving in water at rest, when compared with the water through which the vessel passes, it actually revolves in a body of water dragging after the vessel. Therefore, we must add this progressive motion of the dead water, in which the screw revolves, to the apparent speed of the screw, in order to obtain the actual speed of the screw when compared with the speed of the vessel through the water. It is impossible, or at least quite difficult to obtain anything more than an approximation to this velocity of the drag water in which the screw revolves. Hence it may be observed, how very difficult it is to obtain the actual slip of a screw. In case of the common radial water wheel and feathering wheel, the actual speed of the center of pressure through the water being difficult to obtain on account of the complicated cycloidal motion of which the floats partake, it renders it difficult in the same proportion to calculate their actual slip. Hence it is perfectly safe to be very modest in making nice calculations concerning the actual slip of any propelling instrument, until more is known of the mysteries of their action. If it is difficult to obtain the actual slip, then it is evident that the attempt to obtain the actual per centage of power lost by slip, is rather more difficult, yet most of marine engineers are willing to calculate this loss of power on their thumb-nails, and almost stake their reputations too, on its being correct.

Is this usually received slip theory, then, one of the greatest fallacies taught on the subject of steam propulsion, as Robert Griffiths, that eminent English marine engineer, asserts? Is it not worth while for marine engineers to look this question of slip fairly in the face, and ask themselves if there is not something in it worth thinking about? It has for some time seemed very evident to my mind that there is a far larger per centage of power lost by oblique action, both by the side wheel and the screw, than any one seems to admit. However, I will not attempt to argue this point at present, but simply make this statement for fear any one should think that I assume that either of the propelling instruments now generally used, are more economical in the expenditure of power than is usually estimated. G.

In boring for salt water at Peoria, Illinois, some interesting observations were made. The drill has reached the depth of 770 feet. At 120 feet, a five-foot seam of coal was found; at 207, salt water; at 255, another stratum of coal three feet in thickness; at 317, more salt water, of about the strength of ocean water; at 734 a large stream of water impregnated with sulphur. This water flows upward with such force as to lift the heavy weights attached to the drill, and discharging 75,000 gallons every twenty-four hours. It has been carried in pipes sixty-five feet above the surface, and it is thought can be applied to mechanical purposes.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING MAY 17, 1864.

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42,738.—Grind-stone Dresser.—Robert Barkley & Lewis Semple, Philadelphia, Pa.:

We claim a hand tool consisting of the solid cast-iron wheel, B, having chilled angular teeth, as described, in combination with the forked handle, A, provided with a shoulder, x, on either one or both of its sides, the whole being constructed and combined together as described for the purpose specified.

42,739.—Fire-place.—John S. Blair, Boston, Mass.:

I claim, first, The improved register cap as constructed of a plate, C, provided with a flange, b, as described, and not only having a series of openings, c c c, but a register plate or valve, d, applied to such openings, the whole to be used in manner on a grate and within the open fire-place thereof, and so as to operate therewith, substantially as specified.

Second, I claim the register cap, C, constructed in manner and combined with or to be applied to a fire-place, A, and its grate, B, and used for the purpose or objects substantially as hereinbefore explained.

42,740.—Mode of securing Cloth Bushes in Holes.—Charles Bollerman, New York City:

I claim the employment or use of a screw-thread cut in the hole, a,

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for the purpose of securing therein the bush, b, of cloth or other soft material, in the manner substantially as herein specified.

[The object of this invention is to secure in a permanent and easy manner the cloth bushes in holes, particularly in the actions and other parts of musical instruments. The invention consists in the employment or use, for the purpose of securing the cloth bush in a hole, of a screw-thread cut into said hole, so that when the bush is inserted and expanded by immersing it in water, the cloth passes itself into the even threads and the bush is permanently and securely fastened without the use of cement.]

42,741.—Nipple Primer for Fire-arms.—L. H. Bradford, Boston, Mass. Ante-dated Dec. 29, 1863 :

I claim, first, The piston with priming wire and collar attached with or without the finger band, resting on a spiral or other suitable spring, in combination with a spring barrel, powder reservoir, tube cap, pusher and cut-off as herein described, or any device substantially the same, for the purpose specified.

Second, I claim the pusher, G, and spring, H, either with or without the cut-off, in combination with the tube-cap, powder reservoir, spring barrel, piston and priming wire, as herein described, or any device substantially the same, for the purpose specified.

Third, I claim the finger band connected to the piston playing in the spring barrel with or without a spiral spring, in combination with the powder, reservoir, tube-cap, pusher, cut-off and priming wire as herein described or any device substantially the same for the purpose specified.

42,742.—Nail-plate Feeder.—Peleg S. Bradford, Bridgewater, Mass.:

I claim, first, The combination of the cam, L, attached to the turning stock, D, with a fixed projection, m, or its equivalent on the carrier, C, substantially and for the purpose herein described.

Second, The spring catches, J J, applied and operating in combination with the carrier, C, turning stock, D, and cam, L, substantially as and for the purpose herein set forth.

Third, The combination with the spring catches, J J, of a wiper, l, substantially as and for the purpose herein set forth.

Fourth, The combination of the turning stock, D, eccentric, K, fixed bearing, s, arm, N, and spring, M, all as and for the purposes herein specified.

42,743.—Device for collecting the Dust from Stamp Mills and Crushers.—James Brodie, San Francisco, Cal.:

I claim the introduction of the wind blast through blow-pipes or tubes into batteries, or other crushing machines (as exhibited and applied in drawings), for the purpose of saving the fine dust arising from said crushings.

42,744.—Ice-cream Freezer.—George W. Brown, New York City :

I claim pressing the scraper to the interior surface of the cream can by leverage derived from the handle or crank, substantially as specified.

I also claim the stops, g, and s s, in combination with the spring cross-bar, n, and scraper, l, substantially as and for the purposes specified.

42,745.—Baby Tender.—J. S. Brown, New York City :

I claim the use of the levers, C and D, arranged with respect to each other, and attached to a frame or case, substantially as specified, for the purpose of maintaining a chair, couch, baby-jumper, and horse, in a horizontal position while moving up and down, essentially as described and in combination therewith, the standard, G, pivoted to said levers and constructed with a socket receiving a stem, l, and cross-bar, H, as set forth, for the purpose of supporting the chair, couch and horse above the case, and permitting them to be revolved.

42,746.—Dumping Cart.—Coles A. Carpenter, Glen Cove, N. Y.:

I claim the arrangement of levers, catches and bars or arms, applied to a cart in the manner substantially as shown, by means of which the liberating of the front part of the body, of the cart from the thills and the liberating of the bottom of the tail-board from the body, and the consequent dumping of the load may be effected by a single manipulation on the part of the driver or attendant as set forth.

[This invention consists in applying levers and catches to a dumping cart, arranged in such a manner that by a single manipulation the front end of the body of the cart may be liberated or allowed to tilt and the tail-board also released so as to admit of the load being dumped, thereby avoiding the trouble and consumption of time now required in releasing the above-named parts separately in order to dump the load.]

42,747.—Grain Separator.—W. C. Chamberlain, Dubuque, Iowa :

I claim, first, Attaching the two screens, E F, together, by means of an adjusting strap, g, or its equivalent, so applied as to admit of the ready adjustment of the screen, E, to adapt the machine for cleaning grain of different kinds and qualities, substantially as herein described.

Second, The combination of the two united sieves, E E, with the riddles or sieves of a grain-cleaning machine and with the receiving trough, D, and auxiliary discharging board, J, substantially in the manner and for the purpose described.

Third, The arrangement of the three screening devices, a E F, in a separating machine, in the relation to each other substantially as described and represented, and at the same time providing for the adjustment of the device, E, so that the separating and assorting of the clean and partially-cleaned grain may be effected, as set forth.

42,748.—Breech-loading Fire-arm.—Linus N. Chapin, New Lisbon, N. Y.:

I claim, first, The groove, e, in the breech block for moving the cartridge or blank, as herein described.

Second, And in combination with the groove, e, I claim beveling the end or face of the hammer, as and for the purposes set forth.

42,749.—Parlor Cooking Stove.—Elisha Chase, Chicago, Ill.:

I claim the combination in parlor cooking stoves of the following parts, constructed as above shown, namely: the flues, A A, their entrances, e e, the horizontal plate, C, and the sectional doors or wings, D D.

42,750.—Molasses Cup.—E. R. Cook, Trenton, N. J.:

I claim a cup provided with a slide valve at its bottom and arranged with mechanism in such a manner that the valve may be opened by the pressure of the thumb as the handle of the cup is grasped, and closed by a spring, substantially as and for the purpose specified.

[This invention consists in applying a side valve to the bottom of a cup in such a manner that it may be opened readily in grasping the handle, and admit of the substance in the cup being discharged from the bottom of the latter, and cut off by releasing the valve mechanism.]

42,751.—Spring for Lanterns.—James A. Cowles, Chicago, Ill.:

I claim the spring, d, provided with the shoulder, e, in combination with the slot, o, and pin, p, substantially as and for the purposes set forth and specified.

42,752.—Raking Attachment to Harvesters.—Isaac C Crane, Edgerton, Ohio :

I claim, first, The endless chains, C C, in combination with the board, F, provided with grooves, f f, and rake head, E, provided with the arm, O, all arranged to operate substantially as and for the purpose set forth.

Second, The arm, G, attached to the rake head, E, in combination with the upright, I, attached to the platform, A, substantially as and for the purpose specified.

Third, The rod, H, when used in combination with the rake head, E, attached to the endless chains, C C, for the purpose described.

Fourth, The cone pulleys, L L′, belt, M, belt-shipper, N, in combination with the endless chains, C C, rake head, E, and board, F, provided with grooves, f f, all constructed and arranged in the manner and for the purpose herein set forth.

42,753.—Easy Chair.—J. H. Devereaux, Alexandria, Va.:

I claim, first, In combination with a folding frame and cushion, suspended at the front and back as described, the swinging leg-rests, and projecting cross-bars supporting said leg-rests, under the arrangement and for the purpose set forth.

Second, I claim making the leg-rests in two parts, jointed or hinged together as described, so as to allow of the folding of the same, whereby the chair may be used with or without leg-rests, at pleasure, and may be folded in compact form for transportation, substantially as shown and described.

42,754.—Adjustable Caster.—William C. Dodge, Washington, D. C.:

I claim so attaching caster wheels to sewing-machines, tables, and other household or musical implements, that the weight of said implement may be thrown on or off said wheels at pleasure, substantially as specified.

42,755.—Cartridge Retractor for Many-chambered Fire-arms.—William C. Dodge, Washington, D. C.:

I claim, first, The ejection simultaneously of two or more cartridge-cases from a many-chambered fire-arm, whether the chamber be stationary or revolving, and whether loaded at the front or rear, when said ejection is accomplished without the aid of a sectional cylinder, and when the device which accomplished it is so applied to the cylinder or barrels that it can be operated without detaching the cylinder or barrels from the stock or frame.

Second, I claim the retractor, a, provided with the stem, b, and spring, c, or their equivalents, in combination with the cylinder or barrels of a many-chambered fire-arm.

Third, I claim the retractor, a, whether used with or without the spring, when so applied as to be operated without removing the cylinder or barrels from the stock or frame.

Fourth, I claim providing the retractor, a, with a stem which is made to extend through the cylinder or barrels, and project at either the front or rear end thereof, for the purpose of being operated as shown and described.

42,756.—Floating Mill.—James A. Dorman, New York City :

I claim, first, The combination of one or more grinding mills, E, elevators, G J, and weighing devices, X, all constructed as specified and arranged on a barge or vessel, A, to form a floating mill, as herein set forth.

Second, In combination with the above I claim the discharging elevators, L, placed within a swinging or adjustable frame, M, and arranged with a windlass, T, to operate in the manner substantially as herein set forth.

[This invention relates to a new and useful combination of one or more grinding mills, elevators, and a weighing device, all arranged on a barge or vessel in such a manner that a vessel loaded with grain may, when placed by the side of the floating mill, be unloaded and the grain discharged into the former, weighed, and then ground into flour or meal, all the work being performed with the greatest facility and with but trifling labor.]

42,757.—Compound Paint Oil.—Z. S. Doty, Madison, Wis.:

I claim the herein described paint oil, composed of the ingredients therein named, and compounded in the manner and for the purpose substantially as set forth.

42,758.—Manure-spreader.—Philip Eley, New York City :

I claim, first, The particular manner of attaching or applying the box or hopper, B, to the cart or wagon as set forth, to wit: by having a board, n, attached to each side of the front part of the box or hopper, and a slide, o, attached to each board, n, for the purpose of accommodating the box or hopper to the width of the cart or wagon, in combination with the bars, j j, attached to the box or hopper, and the guides, k, attached to the under side of the bed, l, of the cart or wagon.

Second, The friction wheel, J, fitted in a frame, G, attached to the shaft of the cylinder, E, in connection with the belt, L, and cones of pulleys, F L, or their equivalents, arranged substantially as shown for transmitting motion to the cylinder, E, either from a wheel, K, of the cart or wagon, or by traction from the earth or ground, as herein described.

[The object of this invention is to obtain a simple and efficient device which may be readily applied to the back part of a cart or wagon for spreading manure therefrom, and either in hills, or drills, or broadcast, as may be desired, and thereby obviate the manual labor of distributing it on the land, or in the hills or drills, which consumes considerable time and is comparatively expensive work.]

42,759.—Shoe-string.—William Freeman, New Haven, Conn.:

I claim a shoe-string provided with a hole or perforation to admit of its being applied to a shoe, substantially in the manner as and for the purpose herein set forth.

[This invention is more especially designed for children's and army shoes, or those which are provided with a small number of string holes, and which consequently admit of the strings being liable to be lost when they become casually untied. Army shoes or brogans, those used by soldiers, have but few holes, and when on the march if a string becomes untied it most generally gets detached from the shoe and is lost, and, as they have none on hand, its place cannot be supplied, and in case of passing through mud or swampy places the foot is frequently drawn out from the shoe, causing much inconvenience.]

42,760.—Carriage.—A. S. Grant, Waupun, Wis.:

I claim, first, Combining with a detachable carriage or buggy top and the shifting rail, B, thereof, hooks and eyes, b c, of such a construction as will join the top to the back rail of the seat and allow of the top or cover being turned down to a convenient position for being detached, and also of being turned up on its connections when it has been attached, substantially in the manner set forth.

Second, In combination with the subject matter of my first claim, the latterally expanding side fastenings, arranged substantially as described.

Third, The combination of the hinging hook and eye fastenings, b c, applied to the back of the shifting rail, B, with the gib and wedge fastenings, g i d, constructed and operating in the manner described.

Fourth, The pivoted wedge pointed dogs, s s, in combination with gib fastenings, g g, and receiving loops, d d, the same constituting side fastenings for the arms of the shifting rail, substantially as described.

42,761.—Wicket for Canal Dock Gates.—Alfred H. Griggs, Newark, N. J.:

I claim, first, Constructing the box, B, of two parts, b b′, one of which, b, is fitted in an offset, a, in the frame, A, in connection with the detachable plate, C, provided with the journal, d, and fitted in offset, a′, in the frame, A, substantially as and for the purpose set forth.

Second, The rod, F, provided with the curved arm, k, fitted in the eye, l, attached to the wicket, substantially as and for the purpose specified.

[This invention consists in constructing the gate of two planes which are out of line with each other, and so disposed or arranged that they will close in line with each other when the wicket is shut and its edges brought in contact with the frame in which the wicket is hung, so as to present a surface at right angles to the pressure of the water, and insure an equal balance of the wicket at both sides of its journals or bearings. The invention also consists in a novel arrangement of the bearings of the wicket, whereby they can be removed when worn by use and replaced by new ones. The invention further consists in a novel manner of operating or opening and closing the wicket.]

32,462.—Composition Metal.—Julius Hacket, Bridgeport, Conn.:

I claim the within-described alloy or composition metal, prepared from the material, and substantially in the manner set forth.

[This invention consists in a composition made of copper, arsenic, and cream of tartar, to which a very small per centage of silver may be added.]

42,763.—Press.—G. E. Harding, Bath, Maine :

I claim the slide, E, and rod, g, or its equivalent, in combination with the follower, D, levers, F G, rod, i, press board, C, and fuses, m, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention relates to an improvement in that class of presses in which the follower is forced against the press-board by the action of levers, which are acted upon by a rope running over suitable blocks and connecting with a windlass.]

42,764.—Hinge.—S. E. Harrington, Greenfield, Mass.:

I claim a sliding pivot bolt, passing through and confined in two eyes or bearings attached to one of two objects to be coupled together, and held in position by a spring, in combination with two eyes or bearings attached to the other of said objects, and through which the ends of said pivot bolt are made to pass when the coupling is completed, substantially as described and for the purposes set forth.

42,765.—Lamp Burner.—John O. Harris, Reading, Pa.:

I claim the combination of the wick tube, B, plates, C C, wings, D D, and jackets, E F, arranged and operating substantially as and for the purposes described.

[This invention relates to an improved lamp burner of that class designed for burning coal oil and other similar hydro-carbons, without the aid of a draught chimney.]

42,766.—Machine for threading Wood Screws.—H. A. Harvey, New York City :

I claim, first, The combination of a series of sliding and rotating receivers and holders having the characteristics substantially as specified, with a socket and a revolving screw-driver, the parts operating in combination as described.

Second, I claim in combination with a revolving screw-driver, a receiver and carrier, or a series thereof, moved towards the screw-driver by a differential or fast and slow motion, substantially in the manner and for the purpose specified.

Third, I claim a delivering apparatus consisting of a bent or curved inclined way and a slide operating in the lever or bent thereof, the whole having a mode of operation substantially as described.

Fourth, In combination with a delivering apparatus, substantially such as described, I claim a receiver and carrier which moves as the slide of the delivery apparatus moves, so that the blank may be delivered and received under a mode of operation, substantially as set forth.

42,767.—Apparatus for shaving the Heads of Screw Blanks.—H. A. Harvey, New York City :

I claim the combination of a series of receivers and holders, with a socket or griper, and proper rotating shaving tools, the whole being and acting in combination under a mode of operation, substantially as specified.

42,768.—Apparatus for nicking the Heads of Screw Blanks.—H. A. Harvey, New York City :

I claim a series of sockets capable of receiving and griping screw blanks as described, and having both a sliding and a rotating motion in combination with a sliding griping apparatus, acting substantially as specified.

I also claim a series of rotating and sliding receivers, substantially such as are described, in combination with a sliding griping apparatus and a nicking saw, the combination being substantially as set forth.

And lastly, I claim imparting the motion to a series of receivers as described, not only to grasp blanks by forcing the receivers into a socket but also to feed the blank against a saw, or its equivalent, so as to cut a nick to the proper depth by means of a single cam acting in combination with a series of receivers and holders, substantially as described.

42,769.—Pen-holder and Ink-eraser.—D. E. Holmes, Halifax, Mass.:

I claim, first, the eraser, C, provided with one or more toothed sides, a, and one or more polished sides, b, as and for the purpose set forth.

Second, As a new article of manufacture, the combined pen-holder, calendar, and eraser, constructed substantially as herein shown and described.

[This invention consists in an ink-eraser, having a file cut on one or more sides, and one or more of its other sides polished, for the purpose of smoothing down the paper. This ink-eraser is attached to a pen-holder, which is provided with a perpetual calendar, secured by means of the eraser, and with an ordinary socket for holding a steel pen in the end opposite to the eraser, in such a manner that the date can be ascertained at any moment by a simple glance at the calendar, and the holder can be used in the ordinary manner for writing, or by turning it over any mistake made can be corrected by the aid of the eraser.]

42,770.—Sewing Machine.—W. M. Horne, Boston, Mass.:

I claim combining with the thread-crossers, g h, and the stitch-forming mechanism, a device or devices for holding the ornamental thread or threads, so as to form the same into a series of loose loops on one or both sides of the binding-thread, substantially as set forth.

I also claim the mechanism for producing the movements of the loop fingers, substantially as described.

I also claim operating the thread carriers, by means of the diagonal slots, u, and pin, v, in the manner specified.

42,771.—Process of making Illuminating Gas.—John Howarth, Salem, Mass.:

I claim bringing superheated steam and liquid hydro-carbons in contact with each other in such a manner as to vaporize the latter, and then passing the two vapors thus formed and combined through heated, dry carbonaceous material, as set forth.

42,772.—Apparatus for distilling-off Gases and Vapors.—John Howarth, Salem, Mass.:

I claim so combining devices for superheating steam flues for the passage of products of combustion, and a suitable retort or retorts containing carbonaceous materials, as to cause the internal heat, or that produced by the superheated steam, to always predominate over the external heat, and perform the work of extracting the liquid and volatile products from the retort or retorts without producing destructive distillation, substantially as described.

I also claim the double-chambered upright retort, arranged and operating substantially as described and for the purpose specified.

42,773.—Double-acting Pump.—Benjamin J. C. Howe, Syracuse, N. Y. Ante-date Feb. 4, 1864 :

I claim a hollow piston-rod, having one or more apertures near the lower end, and attached to the piston in such a manner that the apertures in the side of the hollow piston-rod shall be open only to the compressed water on either side, alternately, of the piston as it is moved backward and forward in the cylinder of the pump, substantially described.

42,774.—Instrument for removing Suckers from Tobacco Plants.—George R. Hughes, Glasgow, Mo.:

I claim an implement for removing the buds or germs of suckers from tobacco plants, composed of a bit, J, connected with a suitable stock or handle, A, and arranged so as to be rotated by the action of the hand in which the implement is held, substantially as herein set forth.

[This invention consists in applying a bit to a stock, which is provided with a means for rotating the bit under the action of the hand in which the stock is held, all being arranged in such a manner that the operator may, with great facility and rapidity, remove the buds or germs of the suckers from the tobacco plants, and effectually prevent the growth of suckers.]

42,775.—Rein Snap.—James Ives, Mount Carmel, Conn.

I claim, first, The double-acting lever tongue, d d′, in combination with the spring, h, substantially as and for the purposes described.

Second, Forming the tongue of a "snap," with an extended finger-portion or lip, d′, on it, substantially as and for the purposes described.

42,776.—Sliding Scale for Steam Engines.—Arnold Jillson, Woonsocket, R. I.:

I claim the use of the table of figures, as herein given, in combination with the ordinary slide of a carpenter's rule, for calculating for any given velocity of piston, capacity of cylinder and pressure of steam, the horse-power of a steam engine, substantially as herein described.

42,777.—Letter-opener.—Ross Johnson, Urbana, Md.:

I claim a letter-opener, constructed with a curved shank, a′, flat bottom blade, a, having a blunt edge, e, and a diagonal cutting edge, c, substantially as and for the purposes herein described.

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42,778.—Lock.—Henry W. Kahlke, Brooklyn, N. Y.:

I claim the tumblers, B C D, three, more or less, provided each with a serrated or notched edge and a radial slot, a, and placed on the shaft, E, in connection with the springs or clicks, F, the radius bar, H, provided with the bolt, G, and arm, I, and the lever, K, placed on the shaft, j, having the arm or lever, k, at its front end, all arranged substantially as and for the purpose specified.

[This invention relates to a new and improved lock of that class which is unlocked without the application of a key, and is more particularly designed for chests, desks, etc., although it may be applied to other articles and be arranged as a padlock. The object of the invention is to obtain a lock of the kind specified of simple construction, which may be economically manufactured and be capable of being opened in the dark equally as well as in the light.]

42,779.—Protecting Blank Books.—Joseph C. G. Kennedy, Washington, D. C.:

I claim the application of a rigid packing between the projecting edges of the covers of bound books, when arranged substantially in the manner and for the purpose herein above set forth.

42,780.—Wood-splitting Machine.—John A. Knight, St. Louis, Mo.:

I claim the arrangement of the fixed and loose cranks, J M, grooved pulley, I, and bars, A A′, with the supporting guide-rods, C, eared hammer, D, springs. H, and knife, E, all in the manner herein set forth and described.

I also claim the combination of the gear wheels, O O, crank, M N, and revolving lever, J, when constructed and arranged as specified and operating in connection with the cord, b, and hammer, D, in the manner and for the purpose described.

42,781.—Corn Planter.—R. B. Lanum, Washington, Ohio:

I claim the lever, K, cord, J, rod, I, and spring, H, in combination with the two seed slides, G O, rod, P, tube, L, and box, N, all arranged to operate in the manner and for the purpose herein set forth.

[This invention relates to a new and improved seeding machine of that class in which the seed-dropping mechanism is operated by hand as the machine is drawn along. The object of the invention is to simplify and render more perfect than hitherto the means whereby the seed-slides are operated and also to cover the seed in a better manner so as to leave the earth over it light and free from lumps or clods.]

42,782.—Apparatus for Bleaching.—Jeremiah Meyer, Bay Ridge, N. Y. Ante-dated May 6, 1864:

I claim, first, The endless belt, F, and rollers, G G′ H D D′, in combination with the compartments, B C B′ C′, of the vat, A, constructed and operating in the manner and for the purpose substantially as shown and described.

Second, Arranging the fabric in the compartments, B B′, in serpentine piles substantially as set forth, so that said fabric is exposed to the different liquors a sufficient length of time without interrupting the continuous motion of the apparatus.

Third, The application of the slide, I, with arms, h, in combination with the apertures, g, leading from the chambers, C, to the roller, D′, substantially in the manner and for the purpose specified.

Fourth, The combination with the vat, A, of a washing apparatus, L, constructed and operating substantially as and for the purpose shown and described.

Fifth, The pipe, k, with jets, k*, in combination with the rollers, j j* j′ j′*, as and for the purpose set forth

42,783.—Device for attaching Sails to Mast Hoops.—David Mouat, Brooklyn (E.D.), N. Y.:

I claim the combination of the bow-shaped strap, C, (passing through the eye, b, around the leech, a), the hoop, A, and the bands, e e′, all constructed and connected in the manner and for the purpose herein specified.

[The object of this invention is to provide for the attachment of the sail to the mast hoops in a more durable as well as in a more expeditious manner than has been heretofore known, and to this end it consists in the employment, for such attachment, of bow-shaped metal straps passing through eyes in the sail and around the leech thereof, and attached to the hoop by means of bands or otherwise, dispensing entirely with the use of seizings which take a much longer time to apply, and are subject to chafing by which they are soon worn out.]

42,784.—Cork Extractor.—Jesse L. Morrill, New York City:

I claim an improved cork-drawer with grooved prongs, or with grooved and serrated prongs, substantially as and for the purpose set forth.

42,785.—Device for making Minie Balls.—Peter Naylor, New York City:

I claim an automatic vibrating cutter in combination with the die, s, puncher die, r, and ejecting punch, 6, for the purposes and as specified.

42,786.—Grooving and sizing Minie Balls.—Peter Naylor, New York City:

I claim the wheel, f, and gage, g, fitted as specified for equalizing the size of minie balls, or for simultaneously grooving and equalizing such balls as specified.

I also claim the feeding plate, h, and ring, k, in combination with the wheel, f, and gage, g, for the purposes and as specified.

42,787.—Harness Buckle.—Daniel M. Nixon, Danville, Ill.:

I claim the frame, A, with its curved ends, and bar, a a′, and cross-bar, D, in combination with the tongue, B, with its grooved end, g, and point, B′, constructed and operating as described.

42,788.—Steam Trap.—Wm. Osborne, South Adams, Mass.:

I claim, first, The slide valve, G, in combination with the fixed post, B, and the longitudinally moving box, D, and steam pipe, F, substantially as herein specified.

Second, The arrangement of the steam box, C, of a steam trap to run upon rollers in a direction parallel with a face of a slide valve contained in said box, substantially as herein specified.

[This invention relates to the substitution of a slide valve for the valves commonly used in steam traps; and it consists in a novel construction of the trap whereby such valve is made to effect the shutting in of the steam and to provide for the escape of the water of condensation, and some important advantages are obtained.]

42,789.—Apparatus for evaporating Liquids.—Thomas Oxnard, Marseilles, France:

I claim the employment or use of a series of annular rims, A, supported by two or more arms, b, and secured by means of these arms to a shaft, C, rotating in a pan, B, all constructed and operating in the manner and for the purpose substantially as shown and described.

42,790.—Device for chamfering Barrel Hoops.—Hosea Pelsue, East Wallingford, Vt.:

I claim the eccentric wheel, A d, constructed and operating in the manner substantially as and for the purpose specified.

In combination with the above I also claim the automatic stop composed of the bar, F, upright, G, and pin, h, on the wheel, A, arranged substantially as described.

I further claim the combination of the bar, D, spring, E, and pin, f, for the purpose of regulating the position of the wheel, A, as set forth.

42,791.—Seeding Machine.—Albert Philipp, Appleton, Wis.:

I claim, first, The seed cylinder, D, composed of three parts with corresponding flanches, with the central disk forming two rows of seed receptacles, whereby two kinds of seed can be sown at the same time or separately, as shown and described.

Second, I claim the tube, n i r, when constructed and arranged and employed in the particular manner herein specified.

Third, In combination with seed cylinder, D D, constructed as specified, the arms, Z Z, attached to slides, G G, by which the parts of the cylinder are operated to increase or lessen the seed apertures, as set forth and described.

42,792.—Spark-arrester.—Leonard Phleger, Philadelphia, Pa.:

I claim the arrangement of the chimney, A, conical screen, I, wide passages, H and C, and exit pipes or passages, E, as and for the purposes herein described and represented.

42,793.—Lock.—Edward S. Renwick, New York City:

I claim the combination in a lock of a series of movable tumblers with a series of keepers, operating substantially as herein set forth.

I also claim the combination in a lock of a tumbler, a keeper, a yielding stump, and a stop, the whole operating substantially as set forth.

I also claim the arrangement in a lock of the members of a series of tumbler-keepers in such manner that an engagement takes place between some one or more of them and their tumblers when the latter are properly set to permit the unlocking of the bolt, while one other or more of the said members then bear against spaces without engagement, the whole operating substantially as set forth.

42,794.—Semaphore Telegraph.—H. J. Rogers, Washington, D. C. Ante-dated Jan. 25, 1864:

I claim the combination of a ball, a spring and suspended screen, or of a light, a spring and suspended screen, with a haul-down or equivalent connection, for day and night signals, as herein set forth.

I also claim, in combination with the signal ball, the hinged arms for holding it expanded, and for admitting of its being folded up and readily packed for transportation, substantially as described.

42,795.—Composition for destroying Vermin.—Solomon Rose, Cincinnati, Ohio:

I claim the composition for destroying vermin, composed and compounded as herein described.

42,796.—Last.—J. N. C. Savels, Stoughton, Mass.:

I claim my improved last as made with the flat under surface, i, i′, toe protuberance, g, and the flat upper surface, h l, this whole formation being in manner and for the purpose set forth.

42,797.—Machine for planing Iron.—William Sellers, Philadelphia, Pa.:

I claim, first, Producing a motion radial to the axis of rotation of the circular piece, C, for the purpose of raising the tool, substantially as described.

Second, The use of the bell-crank, S, or its equivalent, for the purpose and in the manner substantially as specified.

Third, Providing the slides on the table with overhanging edges, g g, substantially as described and for the purpose specified.

Fourth, Arranging within the slides of the bed, oil receptacles, h, combined with the stops, i′, substantially as and for the purpose specified.

Fifth, Arranging the outer end of the oil well so that the oil in the swinging oilers cannot touch in passing over, substantially as described and for the purpose specified.

Sixth, In combination with the channel, a, and stop, i, the oil receptacle, h, when so arranged that the oil can never rise to the level of a, substantially as and for the purpose specified.

42,798.—Apparatus for tagging Lacings.—F. J. Seymour, Wolcotville, Conn.:

I claim, first, Bending the tag blank into a U-form and then folding over the edges successively, substantially as specified.

Second, I claim the compressing die, o, actuated substantially as and for the purposes specified.

Third, I claim the folding slides, 23 and 24, constructed and actuated substantially as and for the purposes specified.

Fourth, I claim controlling the intermitted rotation of the shaft, q, by the stop, 19, arm, q2, and lever, q3, substantially as specified.

Fifth, I claim actuating the feeding rollers, 6 and 7, by the wheel, 2, with inclined grooves taking the pin in the disk, 1, substantially as specified.

Sixth, I claim the clamping lever, q, and cutter, applied and operating substantially as specified to cut off the tag blank, as set forth.

Seventh, I claim the guide eyes, 20, actuated substantially as specified, to lift or depress the tag braid, for the purposes set forth.

Eighth, I claim the holding jaws, v v′, actuated substantially as specified, to clamp the braid while the tag is being put on the same, as set forth.

42,799.—Artificial Leg.—George L. Shepard, New York City:

I claim, first, Converting the ball-and-socket joint for the knee, into a limited hinge joint, by means of the slot, a a, and the flanges, b b, regulating and limiting the motion.

Second, I claim the application of the bow or C spring, D D, with its bent or bell-crank, lever, in connection or in combination with the coil or watch spring, as before specified and described.

Third, I claim in the ankle joint or connecting the otherwise more free movements of the ball-and-socket joint, into a modified hinge joint, by the application, or by means of, first, the oblong slot, or opening above and below, with the flanges as described, second, by the pin or pivot passing through the center of the ball horizontally from side to side; third, by the shape and form of the hole through the center of the ball, as more particularly described in the specification and drawing herewith connected; all of which means, as combined, I claim as my invention.

Fourth, For the purposes herein before specified and set forth, I claim the application of the two jews-harp springs and standard underneath the socket, together with that of the two pins passing through the ends of the springs, as described and set forth in the specification and drawings.

Fifth, I claim the mode or method of constructing the toe-joint by the application of the india-rubber band passing around the two pins or rods, their ends riveted to the inner and outer side of the foot, as heretofore set forth and described.

42,800.—Shoe Last.—W. C. Shepherd, New York City:

I claim the plate, D, attached to the under side of the instep block, B, and provided with the hub, c, in connection with the slotted plate, G, attached to the body, A, and the yielding rod, E, all being arranged as shown, and used in connection with the plate, C, or its equivalent, for connecting the last hook with the instep block, substantially as and for the purpose specified.

[This invention relates to a new and improved mode of attaching the instep block to the body of the last, whereby a simple and durable fastening for the purpose specified is obtained, and one which will admit of the instep block being detached from the body of the last by means of the last hook, when the latter is applied to the instep block for the purpose of withdrawing it from the shoe.]

42,801.—Tension Indicator for Sewing Machines, &c.—S. P. Sleppy, Wilkesbarre, Pa.:

I claim the tension indicator made substantially as herein described and for the purpose set forth,

42,802.—Mail Pouch.—Marshall Smith, St. Louis, Mo.:

I claim, first, In combination with a mail pouch, the adjustable partitions, c c c, substantially as described, for the purpose set forth.

Second, In combination with a mail pouch, a lid or cover provided with a metallic frame, m m k h, for the purpose of giving strength to the said pouch and security to its contents, substantially as described.

Third, In combination with a mail pouch the broad hinge-piece, p, for the purpose of allowing the lid to fall clear away from the body of the pouch, substantially as described and for the purpose set forth.

Fourth, In combination with the adjustable partitions, c c c, of a mail pouch, a compresser, f g, for the purpose of securely keeping the letters between the said partition, substantially as described.

42,803.—Mode of utilizing the Waste Acid from Petroleum Refiners.—Robert M. Smith, Baltimore, Md.:

I claim the utilizing of the sulphuric acid that had been previously used for refining petroleum or coal oils, and which contains foul and noxious odors, by applying the acid in the manufacture of salts of various kinds, and burning out the oil or fetid matter, substantially as herein described.

42,804.—Fire-place.—D. Stoner and J. Stoner, West Overton, Pa.:

We claim, first, The combination of the damper, J, with the grate, A, and adjustable draught hole or pipe, F, constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The adjustable valve, b, and rod, a′, in combination with the draught hole, F, damper, J, and grate, A, constructed and operating substantially as and for the purpose set forth.

Third, The hearth, D, with a lid, E, and door, I, in combination with the grate, A, constructed and operating in the manner and for the purpose substantially as specified.

[This invention consists in a damper arranged in front and under the grate in combination with an adjustable draught-hole conducting air from the exterior to and under said grate, and with a front plate closing the space under the grate, in such a manner that by the combined action of said damper and draught-hole the fire in the grate can be regulated at pleasure.]

42,805.—Knapsack.—A. William Süs, New York City:

I claim, first, The suspending strap, B B, in combination with the straps, C C, the whole being attached substantially as and for the purpose set forth.

Second, I claim the straps, D D, attached in the manner described and employed for varying the position and shifting the weight of the knapsack as and for the purpose explained.

42,806.—Soap Compound.—Joseph C. Tilton, Pittsburgh, Pa.:

I claim a soap compound prepared of the ingredients hereinbefore mentioned, when combined in the proportions and manner substantially as herein set forth.

42,807.—Knife for cutting Honey.—A. W. Todd, Chicago, Ill.:

I claim the knife attached to the tang or shank, in the manner substantially as shown and described, to admit of being adjusted in different positions relatively with the tang or shank, as and for the purpose specified.

[This invention relates to a new and improved knife for cutting honey, detaching the combs from the hive and cutting them into square or rectangular pieces. The device being also applicable to other purposes, such as cutting butter, lard, etc. The invention consists in attaching a knife or cutter to a tang or shank in such a manner that it may be adjusted or secured in different positions as the nature of the work may require.]

42,808.—Fanning Mill.—Elwood Tush, Manchester, Iowa:

I claim the combination of the opening, G, seed trough, J, and grain board, K, by which the blast is conducted between and under the grain screens, over the seed screen and up through the rear end of the grain screen, as described.

42,809.—Stump-extractor.—B. F. Tuttle, Chelsea, Mich.:

I claim the combination of the brake bar, F, crossbar, E, and compound pulley, with the lever, C, axle fulcrum, B, and wheels, A, all in the manner and for the purpose herein shown and described.

42,810.—Welt-gage for Sewing Machines.—J. H. Walker, of Worcester, Mass.:

I claim, first, The spring bar, d, adjustably connected to the main bar, A, substantially as and for the purpose described.

I also claim the combination of the spring bar, the side guides, and the spring throat piece, 4, substantially as and for the purpose described.

42,811.—Bark Mill.—Martin Winger, Ephrata, Pa.:

I claim the combination of the hopper, N, and its tube or tubes, with the shaft, B, and cross beam, O, provided with scrapers, I H, all arranged and operating substantially in the manner and for the purpose described.

42,812.—Loom.—Edward Wright and Benaiah Fitts, Worcester, Mass.:

We claim, first, the combination and arrangement of the movable front, the moveable back, and the outer part or binder, d, with the stationary bottom to form a shuttle-box, substantially as described.

Second, We claim the placing the binder at the back or outer end of the shuttle-box, at a distance sufficient to enable the shuttle to be clear of the race before its acts upon the binder, when the shuttle-boxes are detached from the lay, substantially in the manner and for the purpose described.

Third, We claim operating the lay by an intermittent crank motion, substantially as described.

Fourth, We claim applying the power to work the picker staff to the radius bar of the parallel motion substantially as described.

And we also claim the arranging of the picker cams upon the outer ends of the cam shaft, extended beyond the outside of the loom, so as to work in direct combination with the arms of the radius bars or their equivalent, by which the employment of straps or other similar connections is avoided.

Fifth, We claim the employment, in combination with the cam shaft or other convenient part of the loom, of the hand gear or its equivalent, by which the loom is turned forward by the operator, substantially as described.

Sixth, We claim combining the protector, the shipper and the lay so that the driving clutch or its equivalent shall be disengaged from the driving pulley or its equivalent by the direct action of the lay, substantially as described.

Seventh, We claim the combination, in a loom, of the light detached lay, operated substantially as described, the detached shuttle-boxes mounted upon the frame of the loom, and a suitable picking apparatus, so arranged in relation to each other, and to the other mechanism of the loom, as to give the relative movements described, by which a greater rapidity of working is obtained, substantially as described.

42,813.—Plow.—Rodney L. and Albert C. Betts, Brunswick, N. Y.:

We claim, first, The arrangement of a branched draw-beam, B B i, in combination with a double mold-board, A A, recessed or made low in the middle portion of its top edge, between the beam-branches, B B, and having a double share, t, and spreading wings w w, extended laterally beyond the said beam-branches, substantially as herein described.

We also claim the arrangement of a branched draw-beam, B B i, in combination with a double mould-board, A A, provided with a double share, t, and lateral wings, w w, and having the upper part, D, of its low or depressed middle portion removable, substantially as herein described.

We also claim the arrangement of a branched draw-beam, B B i, having runners, S S, formed on the lower ends of its branches, B B, in combination with a double inclined mould-board, A A, having a double share, t, and oblique spreading wings, w w, extended laterally beyond the said beam-branches, substantially as herein described.

42,814.—Useful Products from the Berries of the Green Brier.—Peter Baumgras, Syracuse, N. Y., assignor to himself and Chas. E. Livingston, U. S. Army:

I claim, first, Utilizing the seeds of the smilax, glauca, and rotundifolio, in the manner and for the purpose herein-before described.

Second, Utilizing the sack which surrounds each seed of the berry of the smilax, glauca, and rotundifolio, in the manner and for the purpose herein-before described.

42,815.—Metallic Cartridge.—C. J. Bergen, assignor to Moore's Patent Fire-arms Co., Brooklyn, N. Y.:

I claim a double metallic cartridge case, provided with a channel or channels, extending from the fulminating material to the front portion of the powder, substantially as specified.

42,816.—Furnace for burning Saw-dust.—F. Braun, Miesbach, Bavaria, assignor to Joseph Heindl, Brooklyn, N. Y.:

I claim, first, The drying-room, D, with a roof-shaped or curved bottom, e, in combination with side channels, d, and fire-grate, C, constructed and operating in the manner and for the purpose herein shown.

Second, The employment or use of the basket grate, c, composed of two inclined sections, a c, and a horizontal section, b, in combination with the channel, d, substantially as and for the purpose set forth.

The application of the reflector, E, in combination with the fire-grate, C, constructed with inclined sides, substantially as and for the purpose set forth.

[Further information in regard to this invention can be obtained by addressing the assignor, J. J. Heindl, Brooklyn, N. Y.]

42,817.—Clew Thimble.—Thomas Carroll, assignor to W. W. Wilcox and J. Hall, jun., Middletown, Conn.:

I claim the combination of a guard, c, with the interior of a clew thimble, substantially as and for the purposes set forth.

[This invention consists in the arrangement of a ring or guard in the interior of the clew thimble, to fit loosely over the body of the clew, in such a manner that the thimble is confined on the clew sufficiently close to prevent the rope from chafing against the upper portion of the ring to which it is attached without changing the relative size of the clew and thimble.]

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2,818.—Explosive Shell.—John Groves, assignor to himself, W. R. Beeston, and Thomas Bottomley, Brooklyn, N. Y.:

I claim, first, The attachment of the inner shells, B B, to the outer one A, by means of chains, d d, substantially as and for the purpose herein specified.

Second, The arrangement of the grooves, e e, in combination with the connections of the chains, d d, with the outer shell, A, substantially as and for the purpose herein specified.

Third, The combination of the screwed pins, c c, on the smaller shell, with the frangible frame, C, secured within the larger shell, substantially as and for the purpose herein specified.

[This invention relates to the placing within the shell of an explosive projectile of several smaller explosive shells, the fuzes of which are ignited by fire from the bursting charge of the layer or outer shell, so that the smaller shells are caused to explode at a suitable time after the layer or outer one.]

42,819.—Hand Stamp.—Lemuel P. Jacks, assignor to Isaac H. Clark, Boston, Mass.:

I claim, first, the combination and arrangement of face-plate and fixed flexible rod, without breakage or joint, with the spring and handle, all substantially as described.

Second, I claim the hollow handle in combination with the face-plate, spring, and flexible connection substantially as described.

42,820.—Grain Separator.—J. Kefer, assignor to Owens, Lake, Dyer & Co., Hamilton, Ohio:

I claim the combination of the adjustable inclined chute and deflecting board, K, pivoted at k, within the shaking shoe, the ears, L L, screws, l l, riddle, G, inclined bottom, H, and over-blast fan, C, all constructed and arranged to operate in the manner and for the purposes herein specified.

42,821.—Producing Butter from Milk.—Nelson Orcutt, assignor to himself and G. W. Gregory, Binghamton, N. Y.:

I claim, first, The combination and arrangement of the bellows, springs, flexible tube, and the free second tube, F, operating as and for the purpose described.

Second, The combination and arrangement of the bellows, lever, springs and bail, as and for the purpose described.

42,822.—Stitching Horse.—Hiram E. Paine, assignor to Elisha Waters, Troy, N. Y.:

I claim, first, the arrangement of a circular, eccentrically movable seat, A, in combination with clamping-jaws, B B', substantially as herein described.

I also claim the arrangement of a circular, eccentrically movable seat, A, adjustable vertically, in combination with clamping-jaws, B B', substantially as herein described.

I also claim the arrangement of a circular, eccentrically movable seat, A, having a back-rest, C, attachable to different parts of the periphery of the seat, in combination with clamping-jaws, B B', substantially as herein described.

I also claim the arrangement of a circular, eccentrically movable seat, A, adjustable vertically, and having a back-rest, C, attachable to different parts of the periphery of the seat, in combination with clamping-jaws, B B', substantially as herein described.

42,823.—Revolving Fire-arm.—D. Williamson, assignor to Moore's Patent Fire-arms Co., Brooklyn, N. Y.:

I claim the combination of a sliding spring bolt, parallel, or nearly so, with the axis of the cylinder to be locked, a spring-latch on the side of said bolt adjacent to the hammer tumbler, and a bevelled pin on said hammer tumbler, crossing said bolt in the act of cocking and firing, as and for the purposes specified.

RE-ISSUES.

1,670.—Breech-loading Fire-arm.—E. H. Ashcroft, Boston, Mass., assignee of Richard S. Lawrence, Windsor, Vt. Patented Jan. 6, 1862:

I claim, first, Mounting the barrel on a conical or tapering spindle to turn it aside and load it at the breech, substantially in the manner described.

Second, Screwing the barrel into a sleeve or reinforce, whereto the arms on which the barrel turns are attached, to strengthen and support it, substantially in the manner described.

Third, The combination of the barrel with the flanch, j, carrying a slot or groove, the lips, l, on the sleeve to fit in the slot, and the spring catch lever, k, as and for the purposes set forth.

Fourth, The combination of the barrel with a curved steel cutting edged breech-piece, as described, so that no loose powder can remain on the outside of the breech after the base of cartridge has been cut off, and the barrel turned into position to fire.

1,671.—Draft Regulator.—John Briggs, Roxbury, Mass. Patented Feb. 16, 1864:

I claim the employment of a flexible headed air-tight drum, connected with and operating the valves or draft passages of a heating apparatus, substantially as set forth.

1,672.—Throstle Spinning Machine.—Charles H. Hunt, Madison, N. H. Patented Sept. 28, 1852:

I claim a combination composed of a "let off" or escapement mechanism, or its equivalent, and a reciprocating rotary mangle wheel or mechanism, the whole being substantially such as described, and to be used in a spinning machine, for operating automatically its spindle rail or rails, or the equivalent thereof, in the manner and for the purpose or purposes herein-before specified.

I also claim the combination of the curved links or "goose-necks," e e, with the shaft, K, and its spindle rail connections, when the said shaft, K, has combined with it mechanism, substantially as described, or its equivalent, for turning or operating it, in the manner and for the purposes as herein-before set forth.

I also claim the combination of the adjustable annular collars, or their equivalents, with the shaft, K, and the chains, d d, and their operative mechanism, as specified.

1,673.—Cooking Stove.—Philo P. Stewart, Troy, N. Y. Patented April 12, 1859:

I claim, first, The method or means, substantially as described, of preventing the heat from passing through to the rising flue leading to the chimney by separating it from the back over plate and from the descending flues by non-conducting partitions, or their equivalents therefor, and for the purposes herein set forth.

Second, I also claim the employment of a double damper filled in with cement, or other equivalent non-conducting material, in combination with the flue above the oven and with the rising flue leading to the chimney, substantially as and for the purpose herein described and set forth.

Third, I also claim separating the direct sheet flue under the oven from the return sheet flue below, by means of a plate, constructed substantially as and for the purposes herein described and set forth.

Fourth, I also claim the dividing of the space between the bottom plate of the oven and the bottom plate of the stove, by means of the inclined plate, i, in the manner and for the purposes substantially as herein described and set forth.

Fifth, I also claim the employment of the space or chamber, i, in combination with the outer edge of the oven bottom plate, and with the back and oven plate, in the manner substantially as and for the purposes herein described and set forth.

Sixth, I also claim the sheet flue division plate, l', having a recess, h', at each front corner thereof, and the front projection, A, between such recesses, substantially as and for the purposes herein described and set forth.

Seventh, I also claim the additional bottom plate or encasement device, r, in combination with the broad sheet flue, h, in the manner and for the purposes substantially as herein described and set forth.

1,674.—Mode of reducing Silicates to a Liquor or Gelatinous State.—Geo. E. Vanderburgh, Mamaroneck, N. Y., assignor to the Liquid Quartz Company, New York City. Patented May 29, 1860. Re-issued April 1, 1862:

I claim reducing any disintegrated silicious substance to a liquid or gelatinous state, by bringing it into direct contact with superheated steam, whilst enclosed within a suitable vessel, substantially as herein set forth.

1,675.—Apparatus for treating Silicious Substances.—Geo. E. Vanderburgh, Mamaroneck, N. Y., assignor to the Liquid Quartz Company, New York City. Patented May 29, 1860. Re-issued April 1, 1862:

I claim the employment of superheated steam in a digesting apparatus, constructed and operating substantially in the manner herein represented and described, for the purpose of reducing selicious and other refractory substances to a liquid or gelatinous state.

1,676.—Manufacture of Artificial Stone.—Geo. E. Vanderburgh, Mamaroneck, N. Y., assignor to the Liquid Quartz Company, New York City:

I claim the improvement produced upon artificial stones, blocks, &c., which are principally composed of lime and sand, by saturating the same with a liquid silicate, after the said articles are put into the proper shape for use, by any known or suitable process.

DESIGNS.

1,945.—Arm of a Sewing Machine.—John G. Folsom, Winchenden, Mass.

1,946.—Lady's Hat.—John W. Partridge, Roxbury, Mass.

1,947.—Statuette Group of Figures.—John Rogers, New York City.

EXTENSION.

Preventing Fibers from Binding on Drawing Rollers in Spinning Machines.—John C. Dodge, Dodgeville, Mass. Patented May 14, 1850:

I claim the improved manner of applying and using the roller, the same consisting in placing it not exactly in contact with the lower front drawing roller, but a distance therefrom, and, by means of separate or additional machinery, giving to it a rotary motion at the same velocity and in the same direction with those of the said lower front drawing roller, the whole being substantially in the manner and for the purpose as herein-before specified.

ISSUED MAY 10, 1864.

RE-ISSUES.

1,664.—Filter.—John Kedzie, Rochester, N. Y. Patented January, 10, 1854. Re-issued June 16, 1863:

I claim an inner crock, or vessel, B, having its bottom or base closed, but admitting water by means of perforations, a, a or in some equivalent manner, and provided with an eduction outlet, c, when the same is used in combination with packing, C, and an outer tub or receptacle, A, substantially as herein specified.

1,665.—Seed Drill (Div. A).—Jacob Strayer, South Bend, Ind. Patented May 14, 1861:

I claim making the teeth on one part or portion of feeding roller for seed drills, opposite the spaces between the teeth on the other part or portion of said roller, substantially as described, so as to deliver or discharge the seed more uniformly.

1,666.—Seed Drill (Dev. B).—Jacob Strayer, South Bend, Ind. Patented May 14, 1861:

I claim making the feed roller in two or more sections, substantially in the manner and for the purpose descr bed.

1,667.—Refining Sorghum Juice and Sirup.—J. F. Sheldon, Abington, Ill. Patented Sept. 23, 1863:

First, I claim treating the juice and sirup with soda or other equivalent substance, in the manner and for the purpose specified.

Second, I claim treating the juice or sirup with soda, cream tartar and milk, or their equivalents, as and for the purpose set forth.

1,668.—Brick Machine.—R. A. Ver Valen, Haverstraw, N. Y. Patented June 29, 1852:

I claim, first, The plunger or follower rod composed of two parts, working one within the other, and connected by a pin, d, in one part passing through an oblong slot in the other or other equivalent means, in combination with the lever, H, provided with step projections, b1 b2, or any other device which will serve as a stop to control the play of the part connected with the driving crank, and regulate the pressure of the plunger or follower upon the clay in the molds, as set forth.

Second, The lever, M, connected with the mold-discharging device and with the driving crank, a, of the plunger or follower rod in such a manner that the filled mold will be discharged from the device while the plunger or follower is rising, and this I claim in connection either with the lever, N, or any other means for giving the return movement to the mold-discharging device.

Third, I claim the arrangement of the levers, I, J, N, rods, K, L, vertical lever, M, and the rod, O, with the levers, P, S, and upright shaft, R, for the purpose of operating the feeder, T, and vibrating bar V, substantially as set forth.

Fourth, I claim the employment or use of the spring, V, attached to the vertical lever, M, and operated upon by the rods, r, r, attached to the lever whereby the working of the machine is prevented by any obstruction as described.

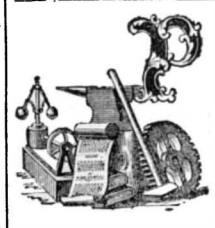
Fifth, I claim the attaching together of the feeder, T, and vibrating bar, U, having a guide rod, m, working in suitable bearings, n, n, or arranged in any other suitable way.

1,669.—Machine for collecting and separating Amalgam and Mercury from Ore Pulp.—Zenas Wheeler, San Francisco, Cal. Patented July 14, 1863:

I claim the tub, A, provided with a concave bottom, a, and chamber, b, in combination with the rotating pads, L, as and for the purpose specified.

I also claim in combination with the pads, L, concave bottom, a, and chamber, b, of the tub, A, the tubular shaft, H, and arms, K, all arranged for joint operation as and for the purpose specified.

I further claim the perpetual and self-regulating discharge of the mercury from under the pulp in the separator through the medium of the chamber, b, tubes, B, b', and outlet or branch, c', or their equivalents in the manner and for the purpose set forth



PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents:—

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the Rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

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Notes and Queries

S. C., of Pa.—By the usual rule your engine of 13-inch cylinder and 3 feet stroke, making 55 revolutions per minute with 50 pounds pressure on each square inch of the piston has a nominal power of 32¼ horses without deducting for friction, etc. The rule is to square the diameter of the cylinder and multiply the product by .7854 this will give the number of inches area in the piston. Multiply the area by the pressure of steam and the number of feet the piston travels per minute. This must be divided by 33,000, which is supposed to be the standard for a horse-power.

J. H., of Canada.—You will have a nominal horse-power of 27 horses; the actual horse-power at 60 pounds pressure and 100 revolutions of the screw shaft will be nearly three times greater. There is no reason to doubt the success of your plans; you have allowed considerable beam in proportion to the length of the boat, but this is an advantage in a small light draught vessel. You have ample engine power.

H. A. B., of Mass.—The proper way to ascertain the weight of castings is to take the number of cubic inches in the shape, and multiply by the weight of one cubic inch; one square foot of cast-iron one inch thick weighs 37.6 pounds, brass 43.9 pounds, copper 45 pounds.

G. F. L., of N. Y.—We know of no mode of silvering wood except the usual one of covering the wood with silver plate, which is secured by an adhesive varnish. Some workman would teach you the process.

T. H., of Ind.—We do not know from whom you can obtain a machine for pearling barley, but would advise you to correspond with some agricultural warehouse.

J. E. B., of Mass.—For a reply to your inquiry concerning the sale and use of a joint-patent, we refer you to the opinion of Judge Chapman of the Supreme Court of Massachusetts, published on page 44 of this volume.

E. H. M., of Tenn.—To stain wood a beautiful blue, dip the wood in a hot solution of sulphate of indigo, and then while hot place it in a solution of three ounces of cream of tartar to a quart of water.

C. C., of Pa.—Your communication in regard to the treatment of typhoid fever would be more suitable for a medical journal than for us.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, May 11, 1864, to Wednesday, May 18, 1864:—

J. H., of N. Y., $16; F. N., of N. Y., $16; M. T., of Iowa, $20; W. C., of Mass., $45; B. S., of Mass., $44; W. P. B., of N. Y., $20; C. B. N., of N. Y., $20; C. C., of Russia, $20; O. C. P., of N. Y., $48; S. & E., of N. Y., $30; J. H., of N. Y., $20; B. M., of Ohio, $20; H. & T., of Cal., $15; H. S., of Tenn., $15; J. S. T, of N. Y., $16; G. S., of Ky., $16; E. D., of Me., $30; R. K., of Tenn., $25; H. E. F., of Conn., $16; J. R. E., of Tenn., $16; T. G. P., of Iowa, $21; B. & A., of Cal., $21; T. H. S., of N. Y., $21; P. M. R., of Cal., $20; J. A. M., of Ky., $20; E. H., of Minn., $25; A. R., of Ill., $16; S. S. J., of Ohio, $25; H. M., of N. Y., $20; W. J. T., of Me., $15; B. & B., of Ind., $16; W. S., of N. Y., $20; W. C. N., of Conn., $20; A. W., of Scotland, $20; L. T. D., of R. I., $20; C. H., of N. Y., $16; J. H., of Conn., $20; B. & L., of N. Y., $10; J. M. M., of N. Y., $22; C. J. E., of N. Y., $10; E. T. S., of N. Y., $41; J. T., of Pa., $20; D. F. H., of Mich., $16; A. B. R., of Iowa, $16; L. W., of Conn., $16; G. W. P., of N. Y., $16; S. L. G., of Conn., $26; E. H. C., of Mich., $25; E. S., of N. Y., $25; G. D., of Conn., $25; W. G., of La., $20; E. H. C., of Mich., $15; J. H. M., of N. Y., $25; E. C. S., of Me., $16; J. C. T., of Pa., $35; H. T., of Wis., $16; H. B. W., of Iowa, $15; W. A. H., of Ind., $25; W. N., of N. Y., $20; N. F. R., of Conn., $40; S. E. T., of Wis., $20; J. J. D., of N. Y., $16; C. A. S., of N. Y., $20; J. J. D., of N. Y., $16; R. B. W., of Ohio, $20; D. & A., of N. Y., $44; E. J. S., of Md., $45; C. & W., of N. Y., $25; J. T. Van D., of N. Y., $16; W. P. M., of Wis., $16; A. R., of Cal., $40; J. F., of Ohio, $16; S. S. H., of N. Y., $28; L. G., of Cal., $23; E. B. B., of Mich., $41; F. L., of La., $16; J. E. H., of Mich., $25; C. A. M., of Ill., $25; W. N. B., of Ind., $15; A. H., of Conn., $25; O. W. & B., of Ill., $25; L. M., of Mich., $16; B. & B., of Ind., $16; J. B., of Iowa, $16; J. B. W., of N. J., $20.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, May 11, 1864, to Wednesday, May 18, 1864:—

A. K., of Prussia; J. B. & B., of Paris; J. S., of N. Y.; W. D., of N. Y.; M. C., of N. Y.; A. D., of N. Y.; H. T. J. P., of France; C. S., of England; M. G., of N. J.; J. G., of England, 2 cases; J. F., of N. J.; J. M. M., of N. Y.; E. T. S., of N. Y.; D. & A., of N. Y.; D. & A., of N. Y.; E. K., of N. Y.; J. A. H., of Wis.; E. H. C., of Mich.; S. S. H., of N. Y.; E. B. B., of Ind.; G. D., of Conn.; B. & A., of Cal.; J. E. H., of Mich.; R. K., of Tenn.; E. D., of Maine; S. L. G., of Conn.; G. S., of Ky.; J. B. W., of N. J.; J. A. D., of Ill.; C. & W., of N. Y.; J. F., of N. J.; E. S., of N. Y.; J. H. M., of N. Y.; C. A. M., of Ill., J. & B., of France; H. F. J. P., of France; T. H. S., of Va.; W N. B., of Ind.; O. W. & B., of Ill.; E. H., of Minn.; H. B. W., of Iowa; S. S. J., of Ohio; W. A. H., of Ind.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

Binding the "Scientific American."

It is important that all works of reference should be well bound The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

Back Numbers and Volumes of the "Scientific American."

VOLUMES I., III., IV., VII., VIII. AND IX., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. II., V. and VI. are out of print and cannot be supplied. We are unable to supply any of the first six numbers of the current volume. Therefore all new subscriptions will begin hereafter with the time the money is received

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, pay able in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

TO SHEET METAL-WORKERS.

Terrell's Sheet Metal-forming Machine, patented May 3d, 1864. This Machine is adapted to be attached to most of the cutting out presses used, and is calculated for forming Tips, Slides, Buttons, Spangles, &c., used in the manufacture of hoop skirts, also eyelets and other articles of sheet metal. It is simple in its construction, and can be run rapidly with safety. The whole or part of the Patent for sale. For further particulars address the inventor, F. J. TERRELL, Ansonia, Conn. 1*

FOR BURLEIGH'S FRICTION CLUTCH PULLEYS, address C. E. PAINTER, Worcester, Mass. 1*

FOR SALE.—AN INDEX GEAR-CUTTING ENGINE, entirely new, never used. Address BULLARD & PREST, 47 Trumbull street, Hartford, Conn. 1*

TO CANDLE MANUFACTURERS.—CONSULTATIONS, and information on the Art of Making Candles; Plans of Manufactures and Apparatus; Processes to manufacture common Candles; Paraffine, Adamantine, and Stearic Candles, Processes to Bleach and Harden Tallow and Greases; Purify Tallow; Bleach Palm Oil and make Candles out of it; Essay of Tallows, Greases, Candles, &c. Address Prof. H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1

THE RAVAGES OF A CARPET; HOME-KEEPING *versus* House-Keeping; What is a Home, and how to keep it; The Economy of the Beautiful; Raking up the Fire.

The above are the titles of the new series of papers which Mrs. Harriet Beecher Stowe is writing for the ATLANTIC MONTHLY.

They are called HOUSE AND HOME PAPERS, and are designed to illustrate the art of making a Happy Home. Each number of the ATLANTIC contains one of these excellent articles, which should be read in every household. The ATLANTIC is furnished at 25 cents a number, or THREE DOLLARS a year, postage paid. Clubs at a liberal discount. Address TICKNOR & FIELDS, Boston, Mass. 1

WANTED.—AN EXPERIENCED CANVASSER IN each State to sell Rights of Doty's celebrated New York Clothes Washer, the simplest and best Washing Machine yet introduced. Highly praised by SOLON ROBINSON, Prof. YOUMANS, and other eminent scientific men. Also to sell Rights of Davis's improved Clothes Dryer, lately illustrated and highly spoken of in the SCIENTIFIC AMERICAN. Address WM. M. DOTY, 23 Elm street, New York. 1*

J. E. STEVENSON, ENGINEER AND MACHINERY BROKER, 200 Broadway, New York, has superior facilities for the manufacture, introduction, and sale of patented inventions of real merit. Patronage solicited. 22 4*

FOR SALE.—ONE 16-FOOT, 42-INCH, FIRST-RATE second-hand Engine Lathe, three Iron Planers, 3, 5, and 7 feet. Address E. C. TAINTER, Worcester, Mass. 1

LANDON'S IMPROVED MILL-STONE BUSH AND Oiling Apparatus combined. To Millers and Manufacturers of, and Dealers in mill irons and mill machinery, and to whom it may concern, notice is hereby given that all infringements on my rights as owner of the above-named Mill-stone Bush, and Oiling Apparatus, will be prosecuted to the extent of the law. State Rights for sale. Address GEO. W. LANDON, Graham Post-office, Jefferson county, Ind. 1*

FOR SALE—IN CONSEQUENCE OF THE DECEASE of the Patentee—the entire Patent Right for "Murphy's Solid Hub Chilled Car Wheels." Used on following roads:—Reading and Philadelphia Railroad; New Jersey Railroad and Transportation Company; Lackawanna and Western Railroad; Pennsylvania Central Railroad; Camden and Amboy Railroad; Philadelphia, Germantown, and Norristown Railroad; Georgia Railroad and B. Company. Manufactured (by permit) at several of the largest foundries in the Union, and certified by twenty-eight of the most eminent Railroad Superintendents to be the best, strongest, not liable to get loose, and by $2 the cheapest wheel in use. For further particulars, address SNYDER & WALTER, 229 Broadway, New York. 1

THEYSON & OGG, 39 GREENE STREET, NEAR Grand street, Machinists, Brass Finishers, and Model Makers. Experimental Machinery, Indicators, Registers, and Steam Gages of any kind accurately and promptly made. 22 12*

ARMY CLOTHING AND EQUIPAGE OFFICE, Cincinnati, Ohio, May 10th, 1864.

PROPOSALS ARE INVITED BY THE UNDERSIGNED until Tuesday, May 24th, 1864, at 2 o'clock P. M., for furnishing this Department (by contract) with—

Drills—Army Standard, ordinary width;
do do 33 inches;
Flannel—Canton, Army Standard;
Flannel—Shirting, do.
Lace—Worsted, Scarlet, 1½ inch Army Standard;
do do ½ do do
Lace—Worsted, Yellow, 1½ do do
do do ½ do do

Samples of which may be seen at the Office of Clothing and Equipage in this city.

To be delivered free of charge, at the U. S. Inspection Warehouse, in this city, in good new packages, with the name of the party furnishing, the kind and quantity of goods distinctly marked on each article and package.

Parties offering goods must distinctly state in their bids, the quantity they propose to furnish, the price, and time of delivery.

Samples when submitted, must be marked and numbered to correspond with the proposal; and the parties thereto, must guarantee that the goods shall be, in every respect, equal to Army Standard, otherwise the proposal will not be considered.

A guaranty, signed by two responsible persons, must accompany each bid, guaranteeing that the bidders will supply the articles awarded to him under his proposal.

Bids will be opened on Tuesday, May 24th, 1864, at 2 o'clock P. M., at this office, and bidders are requested to be present.

Awards will be made on Wednesday, May 25th.

Bonds will be required that the contracts will be faithfully fulfilled.

Telegrams relating to proposals will not be noticed.

Blank forms of proposals, contracts, and bonds may be obtained at this office.

The right to reject any bid deemed unreasonable is reserved.

By order of Col. Thomas Swords, A. Q. M. G.

1 C. W. MOULTON, Captain and A. Q. M.

ARMY CLOTHING AND EQUIPAGE OFFICE, Cincinnati, Ohio, May 16, 1864.

PROPOSALS ARE INVITED BY THE UNDERSIGNED until Monday, May 30th, 1864, at 2 o'clock P. M., for furnishing this Department (by contract) with—

Bootees—Army Standard.
Boots, Cavalry—Army Standard.

Samples of which may be seen at the office of Clothing and Equipage in this city.

To be delivered free of charge, at the U. S. Inspection Warehouse, in this city, in good new packages, with the name of the party furnishing, the kind and quantity of goods distinctly marked on each article and package.

Parties offering goods, must distinctly state in their bids the quantity they propose to furnish, the price, and time of delivery.

Samples when submitted, must be marked and numbered to correspond with the proposal, and the parties thereto must guarantee that the goods shall be, in every respect, equal to Army Standard, otherwise the proposal will not be considered.

A guaranty signed by two responsible persons, must accompany each bid guaranteeing that the bidder will supply the articles awarded to him under his proposal.

Bids will be opened on Monday, May 30th, 1864, at 2 o'clock P. M., at this office, and bidders are requested to be present.

Awards will be made on Tuesday, May 31st.

Bonds will be required that the contract will be faithfully fulfilled.

Telegrams relating to proposals will not be noticed.

Blank forms of proposals, contracts, and bonds may be obtained at this office.

The right to reject any bid deemed unreasonable is reserved.

By order of Col. Thos. Swords, A. Q. M. G.

222 C. W. MOULTON, Captain and A. Q. M.

ARMY SUPPLIES.

OFFICE OF ARMY CLOTHING AND EQUIPAGE, 502 BROADWAY, NEW YORK, May 17th, 1864.

SEALED PROPOSALS WILL BE RECEIVED AT this Office until 12 o'clock, M., on Thursday the 26th of May inst, for furnishing by contract, at the Depot of Army Clothing and Equipage in this city,—

Army Blankets, wool, grey (with the letters U. S. in black, 4 inches long, in the center), to be 7 feet long, and 5 feet 6 inches wide, to weigh 5 pounds each, of domestic manufacture.

Bidders will state the quantity they wish to furnish, the shortest time in which they can make deliveries, and how soon they can complete the delivery of the quantity they bid for. They will submit, with their proposals, a sample of the article they propose to furnish.

All bids must be accompanied by a proper guaranty, signed by two responsible parties, setting forth that if a contract is awarded to the parties named therein, they will at once execute the same, and give bonds for its faithful performance.

The United States reserves the right to reject any part or the whole of the bids as may be deemed for the interest of the service.

Proposals should be endorsed "Proposals for furnishing Blankets," and addressed to

1 LT.-COL. D. H. VINTON, Dy. Qr. Mr. Genl.

ARMY CLOTHING AND EQUIPAGE OFFICE, Cincinnati, Ohio, May 12, 1864.

PROPOSALS ARE INVITED BY THE UNDERSIGNED, until Thursday, May 26th, 1864, at 2 o'clock, P. M., for furnishing this Department (by contract) with—

Cloth, D. B. Uniform—Army Standard:
Flannel, Blouse do. do.

Samples of which may be seen at the Office of Clothing and Equipage in this city.

To be delivered, free of charge, at the U. S. Inspection Warehouse, in this city, in good new packages, with the name of the party furnishing, the kind and quantity of goods distinctly marked on each article and package.

Parties offering goods must distinctly state in their bids the quantity they propose to furnish, the price, and the time of delivery.

Samples when submitted, must be marked and numbered to correspond with their proposal, and the parties thereto must guarantee that the goods shall be, in every respect, equal to Army Standard, otherwise the proposal will not be considered.

A guaranty signed by two responsible persons, must accompany each bid, guaranteeing that the bidder will supply the articles awarded to him under his proposal.

Bids will be opened on Thursday, May 26, 1864, at two o'clock, P. M., at this office, and bidders are requested to be present.

Awards will be made on Friday, May 27th.

Bonds will be required that the contracts will be faithfully fulfilled.

Telegrams relating to proposals will not be noticed.

Blank forms of proposals, contracts, and bonds, may be obtained at this office.

The right to reject any bid deemed unreasonable is reserved.

By order of Col. Thomas Swords, A. Q. M. G.

1 C. W. MOULTON, Captain and A. Q. M.

SALE OF CONDEMNED CLOTHING, CAMP AND GARRISON EQUIPAGE, TENT CUTTINGS, &c.

CHIEF QUARTERMASTER'S OFFICE, DEPOT OF WASHINGTON, WASHINGTON, D. C., May 12, 1864.

Will be sold at public auction, at Government Warehouse, No. 6 Seventeenth street, between H and I streets, Washington City, D. C., at 12 o'clock M. Thursday, May 26, 1864, under the supervision of Capt. D. G. Thomas, M.S.K., U.S.A., a large lot of stores condemned as unfit for public service, viz:—

Infantry and Cavalry Coats and Trowsers, Shirts, Drawers, Stockings, Felt Hats, Caps, Trumpets, Bugles, Flags, Drums, Tents, Tent Poles, Mess Pans, Camp Kettles, Spades, Shovels, Knapsacks, Haversacks, Bed Sacks, &c., &c., &c.

Also about sixty tuns of Tent Cuttings.

Terms, cash in Government funds.

Successful bidders will be required to remove the stores within five days from date of sale.

D. H. RUCKER, Brigadier General and Chief Quartermaster,
1 Depot of Washington, D. C.

PATENTS.—SNYDER & WALTER, 229 BROADWAY, New York. Valuable Patents sold for cash on commission. Consignments respectfully solicited. Being connected with the American Manufacturing Company (Mr. Walter as a Trustee) we are enabled to introduce, manufacture, or sell first-class Patents on satisfactory terms. Address SNYDER & WALTER, 229 Broadway, New York Refer to Sheppard Seward & Co., 214 Pearl street, New York; and John Wilmot, Esq., 2 Bowling Green, New York. 1

MECHANICAL DRAWINGS NEATLY EXECUTED at 406 Walnut street, Philadelphia. 22 8*

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THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars address—

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Publishers of the SCIENTIFIC AMERICAN,
No. 37 Park Row, New York City.

PATENT RIGHT FOR SALE.—VANDERCAR'S PATENT Furnace Bars are now in great demand. The right will be sold low. Apply to WM. J. SAYERS, 4 Sands street, Brooklyn, N. Y. 1*

MACHINE SHOP AND FOUNDRY AT OWEGO FOR SALE.—Every facility for doing a large and prosperous business. Railroad and canal privileges unsurpassed. The establishment is well provided with tools, extensive room, plenty of work, very low rent, and long lease. The proprietor is out of health. Address JOHN McCOLLUM, 40 Eldridge street, New York; or W. H. Bell, Owego, Tioga county, N. Y. 21 2*

TO CAPITALISTS THAT DESIRE TO START SOME manufacturing business in the West, may find it to their advantage to examine our water power on the Turkeyriver, at Elkador, Clayton county, Iowa. We will sell or lease one-half of the power and some land on the East bank of the river, opposite a large flouring mill. We aretwenty miles from the Mississippiriver at McGregor, and sixteen miles from Clayton. There will be plenty of water, and we can get eleven feet head. Building material of the best kind near by. Address as above to LEVI A. BEARDSLEY or S. V. DAVIS. 21 2*

AGENTS WANTED.—TO SELL SEWING MACHINES and other useful articles. Machine has an established reputation, and is the cheapest and most practical one in the market. For. full particulars address Franklin Sewing Machine Co., Boston, Mass 20 10*

PETTEE'S IMPROVED ENVELOPE.—CAUTION.—The public are hereby cautioned against purchasing, making, vending, or using Envelopes made under or by virtue of any letters patent, alleged to have been recently granted for supposed inventions, which are infringements on the patent issued March 22d, 1859, to S. E. Pettee, and assigned to and now owned by George S. Stimble. All infringements will be proceeded against. E. J. SPANGLER, Sole lessee.
Philadelphia, April 27, 1864. 20 3*

WANTED—A Situation by a person who has an experience of 25 years in the management and construction of Railway Machinery and Marine Engines; has had entire charge of the Machinery Department of several important Railroads; also that of a line of Steamers; can produce the most satisfactory references as to character and ability. Letters addressed to "Machinery," care of C. W. COPELAND, Consulting Engineer, No. 122 Broadway New York, will meet with prompt attention. 19-4*

CALORIC ENGINE MANUFACTURERS.—WANTED, sizes, prices, and description of Caloric Engines, from parties who manufacture them. Address M. BENTLEY, Covington, Ky. 21 3*

THE COLD-IRON BAR CUTTERS ARE INVALUABLE in Machine Shops. They will cut off four inch, round or square bars. For circulars or machines address CRESSON & HUBBAR 1,509 Pennsylvania avenue, Philadelphia. 20 5*

PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability and economy with the minimum of weight and price. They are widely and favorably known, more than 300 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J.C. HOADLEY & CO. Lawrence, Mass. 17tf

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FOR SALE.—A VALUABLE LOT OF TURNED SHAFTING, ready for use. 3 pieces, 7¼ inch diameter, each 16 feet long, and 1 piece, 7¼ inch diameter, 18 feet long, with couplings attached; 3 pieces, 4⅞ inch diameter, each 16 feet long, turned the whole length, without couplings. Apply to the Superintendent of the Norway Iron Works, Dorchester avenue, South Boston, Mass. 21 2

SCALY BOILERS.

WINANS' ANTI-INCRUSTATION POWDER effectually cleanses dirty Boilers without injury or loss of time. A thousand references. Send for circular to H. N. WINANS', 11 Wall street, New York. 20 4*

HAMMERED AND ROLLED CAST STEEL

FOR TOOLS, DRILLS, DIES, SPRINGS, CARBINES, also steel forged to any required shape, by the
MONTAUK IRON AND STEEL CO.
Office, 16 Beekman Street, New York. 16tf

CIVIL AND MECHANICAL ENGINEERING.—F. W. EVANS, Ancien Eleve de l'Ecole Imperial Centrale des Arts et Manufactures, de Paris, gives particular attention to the construction of Iron Roofs, and Stone, Iron and Wooden Bridges. 103 State street, Boston, Mass. 16 10*

MANUFACTURERS OF STEAM ENGINES, WITH the link motion, variable cut off of the most approved construction; also Lathes, Mill-gearing, Shafting, Hangers and Machinery in general. Address M. & T. SAULT, New Haven, Conn. 19 26*

GUN AND PISTOL SCREWS.—COMSTOCK, LYON & CO., Manufacturers (Office, 74 Beekman street, New York), are always prepared to furnish Gun and Pistol Screws to sample, Screws to fit the U. S. Musket, Sewing Machine Screws, and Metal Screws generally, of the best quality, at short notice. 10 26*

REYNOLDS' TURBINE WATER WHEELS.—COMPETENT men are employed to measure streams, make plans, and put in flumes, wheels, and gearing. TALLCOT & UNDERHILL, No. 170 Broadway, New York. 19 tf

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THE "KING MICROSCOPE."—DOUBLE LENS.—Prof. Horsford, of Harvard University, says:—"It works very well, and is got up very neatly." It magnifies 25 diameters. Price 75 cents. Also, "THE BOWEN MICROSCOPE" for 35 cents, or four for $1. One "King" and one "Bowen" Microscope for $1. All mailed free of postage. Address F. D. BOWEN, Box 220, Boston, Mass. 19 4*

ORDNANCE OFFICE.

WAR DEPARTMENT,
WASHINGTON, May 1, 1864.

SEALED PROPOSALS will be received at this office until Monday, the 23d day of May, 1864, for the delivery at the following arsenals, Cavalry Accoutrements, United States Cavalry pattern, as hereinafter specified.

At the New York Arsenal, 25,000 sets.
At the St. Louis Arsenal, 5,000 sets.
At the Frankfort Arsenal, 10,000 sets.
At the Alleghany Arsenal, 10,000 sets.

These Accoutrements are to be made in strict conformity with the regulation pattern, which can be seen at the above named places. Each set is to consist of one Sabre-belt and plate complete; one Carbine-sling with swivel complete; one Sabre-knot; one Carbine Cartridge-box; one Pistol Cartridge-box or Pouch; one Belt-holster for Army size revolver, and one pouch with cone pick. All of which are to be made of the best materials and workmanship. The Sabre-belt, Sabre-knot, and Carbine-sling are to be of Buff Leather Blacked, and the Cartridge-boxes, Belt-holster, and Cap-pouch of Pure Oak Tanned Leather.

It is to be distinctly understood that this Department is to have the privilege of inspecting the work done under any contract it may award, in all stages of its progress; especially, to examine the stock before cutting. They are to be subject to the final inspection at the Arsenal, where delivered, before being received by the Government. None are to be accepted or paid for but such as are approved upon inspection.

Deliveries must be made in lots of not less than one-tenth (1-10th) per week of the whole number contracted for; the first delivery to be made on the 20th day of June.

Failure to make deliveries at a specified time will subject the contractor to a forfeiture of the number he may fail to deliver at that time.

The Accoutrements must be boxed in the usual manner; the boxes to be charged cost, to be determined by ths inspector.

Bidders will state explicitly the Arsenal, or Arsenals, where they propose to deliver, and the number of sets they propose to deliver at each place, if for more than one.

No bids will be considered from parties other than regular manufacturers, and such as are known to this Department to be fully competent to execute in their own shops the work proposed for. Should any party obtaining a contract offer Accoutrements other than those made in his own shops, they will be rejected, and the contract rendered null and void.

Bidders will enclose with their bids the written acknowledgments of their sureties over their own signatures.

Each party obtaining a contract will be obliged to enter into bond with approved sureties for its faithful execution.

Upon the award being made, successful bidders will be notified, and furnished with forms or contract and bonds.

The Department reserves the right to reject any or all bids if not deemed satisfactory.

Proposals will be addressed to "Brigadier-General George D. Ramsay, Chief of Ordnance, Washington, D. C.," endorsed "Proposals for Cavalry Accoutrements." GEORGE D. RAMSAY,
20 3 Brigadier-General, Chief of Ordnance.

Bids will also be received for these accoutrements to be made of the best grained leather, instead of buff.

GUM-ELASTIC CRUTCHES.—STATE RIGHTS FOR SALE.—These Crutches have a gum tube across the top, making a soft and elastic support to the arm, and enabling the wearer to walk with more comfort than can be derived from any other crutch. For particulars address J. HARTMAN, 123 Pine street, Philadelphia. 19 4*

FOR 75 CENTS, THE JANUARY, FEBRUARY, March, April, and May Nos. of the ILLUSTRATED PHRENOLOGICAL JOURNAL sent by return post; or a year for $2. To secure the Pictorial Double Numbers, with Physiognomy, Ethnology, Phrenology, Physiology, Psychology, and all the portraits of distinguished men, send at once to FOWLER & WELLS, No. 389 Broadway, New York. 19 5*

E. H. BELLOWS, MANUFACTURER OF PORTABLE and Stationary Steam Engines, Worcester, Mass. 17 10*

MACHINERY.—S. C. HILLS, No. 12 PLATT STREET, New York, dealer in Steam Engines, Boilers, Planers, Lathes, Chucks, Drills, Pumps; Mortising, Tenoning and Sash Machines; Woodworth's and Daniels' Planers, Dick's Punches, Presses and Shears; Cob and Corn Mills; Harrison's Grist Mills; Johnson's Shingle Mills; Belting, Oil, &c. e

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GALVANIZED IRON.—GALVANIZING DONE WITH despatch, and castings furnished if desired, either *Malleable* or *Gray* iron. Address, WILCOX & HALL, Middletown, Conn. 16 12eow*

TO PURCHASERS OF RIFLES.—IN CONSEQUENCE of numerous applications which I have received since the publication of my "Hints to Riflemen," I am induced to offer my services to the public as an agent for the purchase of rifles of every description. Having no personal interest in any particular arm, and having made such arrangements with the principal manufacturers and dealers, that I can supply purchasers with arms of any pattern that is in the market, I will select for any one who leaves the choice to me, or will procure a gun of any specified pattern and prove its capacity by such tests as will enable me to certify to its merits. It is proper to state that the unprecedented demand for rifles renders it impossible to procure immediately those of the best models; but my arrangements will enable me to do so at the earliest possible date, and customers will be served in the order of their application. Address H. W. S. CLEVELAND, Danvers, Mass. 21 2*

PAGE'S PATENTED LIME KILN WILL BURN 300 bushels lime per day, with three cords wood or 1¾ tun coal, hard or soft. Address C. D. PAGE, Cleveland, Ohio. 17 12*

SHIMER & MILLER, AGRICULTURAL AND COMMISSION Dealers, Hillsboro, Ill., give personal attention to the introduction and sale of all kinds of Machinery. Business solicited and references given. 18 9*

IMPORTANT TO RAKE MANUFACTURERS.—COLUMBUS COLEMAN, Marion avenue, Allegheny City, Pa., continues to fill orders for Steel Rake Teeth, adapted to the latest improved Horse Rakes. 15 8*

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STEAM ENGINES AND BOILERS OF EVERY DESCRIPTION; Shafting; Pulleys and Machinists' Tools, for Sale by C. GAY, 29 Doane street, Boston, Mass. 9 20*

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DRAFTING INSTRUMENTS FOR ENGINEERS, SURveyors, Architects, Machinists, and Schools, Engineers' and Surveyors' transits, levels, compasses, and chains, Chesterman's Metallic and Steel Tape-measures, for sale, wholesale and retail, by JAMES W. QUEEN & CO., 924 Chestnut street, Philadelphia. Priced and illustrated catalogues gratis. 21 12*

A MESSIEURS LES INVENTEURS.—AVIS IMPORTANT Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront regues en confidence. MUNN & CO.,
Scientific American office, No. 37 Park Row New York

VALUABLE WORK FOR INVENTORS PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them——Importance of the Specification—Who are entitled to Patents—What will prevent the granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, No. 37 Park Row, New York.

IRON PLANERS, ENGINE LATHES, DRILLS AND other machinists' tools, of superior quality, on hand and finishing, for sale low. For description and price address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn. 1tf

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WHEELER & WILSON'S HIGHEST PREMIUM LOCK STITCH SEWING MACHINES, No. 625 Broadway New York. 17 92*

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For Railroads, Steamers, and for machinery and Burning PEASE'S Improved Engine and Signal Oil, indorsed and recommended by the highest authority in the United States. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American," after several tests, pronounces it "superior to any other they have ever used for machinery." For sale only by the inventor and Manufacturer, F. S. PEASE, No. 61 Main street, Buffalo, N. Y.

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NERVOUS DISEASES AND PHYSICAL DEBILITY, arising from Specific causes in both sexes—new and reliable treatment, in Reports of the Howard Association—sent in sealed letter envelopes, free of charge. Address Dr. J. SKILLIN HOUGHTON, Howard Association, No. 2 South Ninth street, Philadelphia, Pa. 14 12*

AMERICAN NEEDLE COMPANY, 442 BROADWAY, New York, J. W. Bartlett, Needle manufacturers for all the Sewing Machines. Bartlett's Burnished Hand Needles Hackle pins, &c. 12 tf

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ROUND AND SQUARE MATCH MACHINES, Woolen Cards, Rag Pickers, &c., Manufactured by RICHARDSON & CO., Athol Depot, Mass. 10 13*

HOLSKE & KNEELAND, MODEL MAKERS. PATENT Office Models, Working Models, and Experimental Machinery, made to order at 100 Walker street, between Center and Elm, New York. Refer to Munn & Co., SCIENTIFIC AMERICAN Office. 6tf

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GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the improved Balance Wheel Pump, Duplex Vacuum and Steam Pumps, and the Water Propeller, an entirely new invention for pumping large quantities at a light lift. For sale at Nos. 55 and 57 First street, Williamsburgh, and No. 74 Beekman street, New York.
1tf GUILD, GARRISON & CO.

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, New York. 12 tf

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SAVING OF FUEL TO PARTIES USING STEAM.—DAMPER REGULATORS.

Guaranteed to effect a great saving in fuel and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms of flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 5 Park Place, New York 24 26*

BARTLETT'S NEW COOLER AND REFRIGERATOR COMBINED.—Patent to be sold in States or Counties, to enable Tin or Iron Workers to manufacture and supply their own trade, and save transportation. Terms will be low. J. W. BARTLETT, Patentee, 442 Broadway, New York. Model coolers furnished purchasers. 19tf

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CHLORATE OF ZINC FOR BURNETTIZING TIMBER—A Pure Article. For sale by BOYD BROS., 159 Front street, New York. 13 12*

SELF-FEEDING HAND SAWING MACHINE, TALPEY'S PATENT—Invaluable to Carpenters and Builders. One man can easily do the work of three, with less waste of stuff, and in a far better manner. It is pronounced by hundreds, who are using them, to be the greatest wood-working machine ever invented. Send for a Circular. HOAG & HAMPSON, 96 Maiden Lane, New York. 18 5*

WATER WHEELS.—OVER 900 OF WARREN'S Turbines are now operating with great success in Cotton, Woolen, Grist, and Saw Mills, &c. For circular, address A. WARREN, Agent, American Water Wheel Company, 31 Exchange street, Boston, Mass. 19 12*

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

Dieselbe ist zu haben:

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nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. St. sowohl als in Europa. Ferner Auszuge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche welche patentiren wollen.

Preis 20 Cts., per Post 25 Cts.

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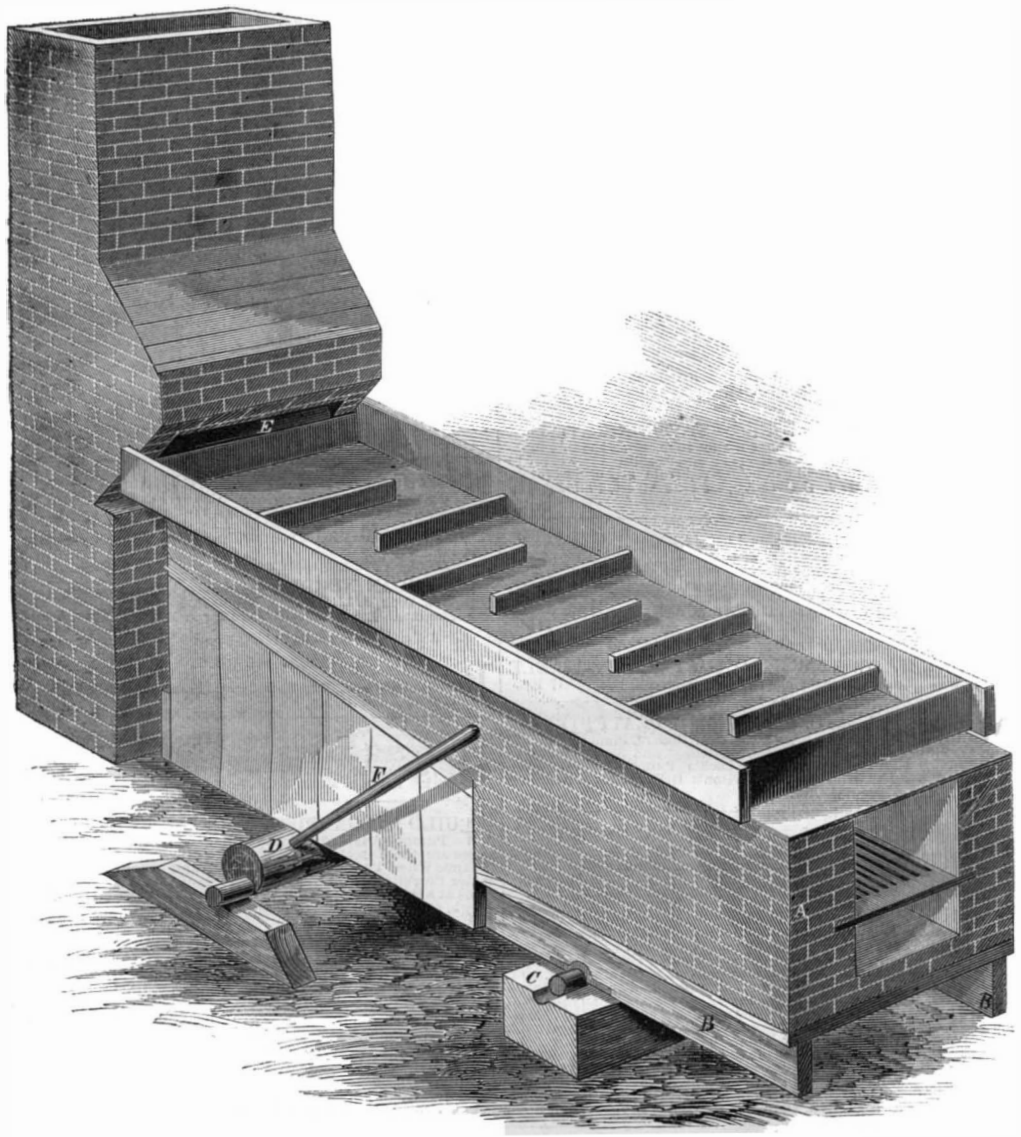
Improved Evaporator.

Whenever a new article is introduced which bids fair to become staple, the energies and talents of inventors are directed toward cheapening and expediating its manufacture. This has been eminently true of sorghum sugar. Its cultivation at first was attended with poor success, but through patience and perseverance it is getting to be of the first importance. The engraving published herewith represents a new arch for sorghum evaporators. Its construction and operation are thus described by the inventor.

This arch is constructed of brick, and has a stationary chimney so arranged as to secure instant and perfect adjustment, ease and convenience in operating



BODWELL'S IMPROVED ARCH FOR SORGHUM EVAPORATORS.

it, and also economy in fuel—characteristics which at once give it superior advantages. By reference to the accompanying drawings the operation of this arch may be readily comprehended. The arch, A, with its grate and fire-box, is built upon the two bed-pieces, B, the whole resting on the journals, C, and the center shaft and journal, D. The arch is connected to the chimney by means of a sliding flue, E, sufficiently large to cover the opening in the chimney at the greatest elevation or depression of the pan. The arch is balanced on the journals, C, having slight preponderance, however, on the eccentric shaft and cam, D, so that when in the process of evaporating the juice it becomes necessary to either elevate or depress the pan, it can be done instantly and with but little expenditure of power, by means of the lever, F, which is inserted in the cam before mentioned. The advantages claimed for this arch and which give it great superiority are:—that a brick arch of any desirable length and dimensions can be managed with perfect ease; also its economy and simplicity of construction and saving in fuel, which by actual test gives in the former case a saving of fifty per cent., and in the latter thirty-three per cent; the operator is always able to be at the place where his services are most required during the process of evaporating. This arch was patented on Feb. 23, 1864; for further particulars apply to the patentee, L. W. Bodwell, Ann Arbor, Mich.

Plumbago Mine in Lower Canada.

We have been shown some rich specimens of plumbago, large quantities of which have been discovered on a piece of property on the St. Maurise river, Canada East, owned by Mr. P. B. Vanasse, Quebec. The specimens are very pure, being singularly free from grit, and the mineral is obtained in larger pieces than in many of the mines now worked in England and the United States. Plumbago, or graphite, is used principally for lead pencils, in the manufacture of crucibles, as a lining of molds for delicate castings, and for stove polish. It is a valuable mineral; immense fortunes have been made for many years from the Borrowdale mine in Cumberland, England, said to produce the finest graphite in use. —*Kingston News.*

Improvement in Ships' Compasses.

We are informed that Mr. L. G. Vassallo, late of the Austrian navy, but now an officer in the service of the United States, has made an improvement in ships' compasses, which consists in constructing a sun-dial upon the compass. The hours are engraved upon the glass cover of the compass, and the gnomon is hinged at its lower end so that its inclination may be adjusted to correspond with the latitude. In 1849 we bought a portable compass and sun-dial constructed on this plan in a German toy-shop for 18 cents.

ELEVATION OF THE COAST OF CHILI.—That the latter coast is being gradually elevated, would appear from the fact that for half a century the harbors of the country have been diminishing in depth. This change, however, might be accounted for by supposing the existence of currents bringing in *debris*. M. Pissis in the *Comptes Rendus*, gives other proofs. On examining the coast between Conception and Rio Maule, the various escarpments of schistose rocks will be found to present several cavities formed in other times by stone-boring mollusks; these markings succeed each other without interruption from high-water level to a hight of from 8 to 10 metres (about 30 feet). The upper ones are much more crowded than those below, thus proving that the elevation has been gradual; for had it taken place at various intervals, there would be a series of interruptions in the series, which do not exist.

HOW SMALL INVENTIONS ARE INTRODUCED.—It is proposed to form a company for the manufacture of twist drills, etc., in New Bedford, Mass. Twist drills are used by machinists, gun-makers, etc., in nice mechanism; heretofore they have been very expensive, as they have been made only by hand. S. A. Morse, a practical machinist of East Bridgewater, has invented a machine by which these are made at about half the cost of the hand-made drills, and of superior excellence.

THE Pacific Mail Steamship Company have another splendid steamer—the *Sacramento*—nearly ready for service. She will be the third new ship within three years, and two others are now building. These vessels are unsurpassed for speed and economy.

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Scientific American,

FOR 1864!

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